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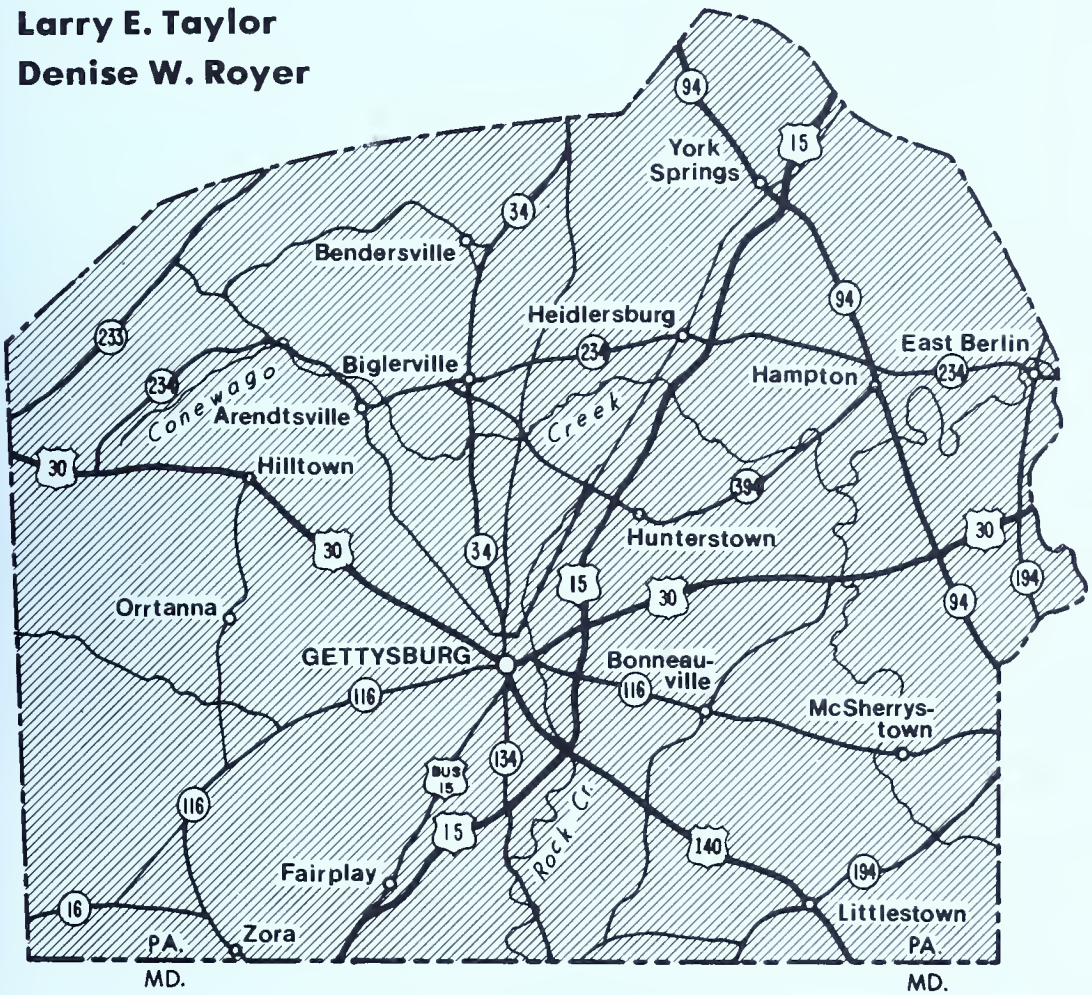
Water Resource Report 52

1981

SUMMARY GROUNDWATER RESOURCES OF ADAMS COUNTY, PENNSYLVANIA

Larry E. Taylor
Denise W. Royer



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
OFFICE OF RESOURCES MANAGEMENT
BUREAU OF
TOPOGRAPHIC AND GEOLOGIC SURVEY
Arthur A. Socolow, State Geologist

Water Resource Report 52

SUMMARY GROUNDWATER RESOURCES OF ADAMS COUNTY, PENNSYLVANIA

by Larry E. Taylor and Denise W. Royer
Pennsylvania Geological Survey

PENNSYLVANIA GEOLOGICAL SURVEY

FOURTH SERIES

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PREFACE

This report is presented as a comprehensive description and inventory of the groundwater resources available in Adams County. With the continuing growth of our population and the expansion of our industries, there is an ever increasing rise in demand for quality water resources. Groundwater, or subsurface water, constitutes one of the largest reserves of quality water remaining to be developed.

This report can be of assistance to anyone who is planning for future water needs. It will help to evaluate the quantity and quality of groundwater available in any part of the county, and it will aid in choosing the locations, depths, and conditions most favorable for the desired groundwater yield.

While this publication has attempted to include all available groundwater data for the county, the Pennsylvania Topographic and Geologic Survey will continue to collect groundwater and water well data for the area; such data will be kept on file at the Survey offices in Harrisburg, available to anyone who desires the very latest information.

We hope that this report will aid users of water in Adams County to develop and manage their water resources so as to accommodate their water needs.

ARTHUR A. SOCOLOW

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(in envelope)

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ABSTRACT

Adams County covers about 526 square miles in south-central Pennsylvania. The 1970 population of 56,937 used approximately 8.7 million gallons of water per day, 79 percent of which was obtained from groundwater sources.

An estimated 24 inches (or 61 percent) of the 39.3 inches of average annual precipitation is lost to evapotranspiration. Annual stream discharges range between 14.3 and 15.6 inches. Approximately 40 percent of this streamflow is supplied by the groundwater system.

Baseflow to streams in the area underlain by Triassic age rocks averages about 200 (gal/min)/mi^2 (gallons per minute per square mile). The areas underlain by carbonate rocks probably discharge about 400 (gal/min)/mi^2. This information is used to calculate the average available groundwater resource, which is approximately 98 Mgal/d (million gallons per day) from the Triassic age rocks and 12 Mgal/d from the carbonates.

The quantity of groundwater that can be withdrawn by wells is generally adequate for most uses. Domestic supplies (5 to 10 gal/min [gallons per minute]) are possible from all of the bedrock units. However, many wells in the diabase, metabasalt, and metarhyolite have marginal yields (less than 5 gal/min), and some are totally inadequate (less than 1 gal/min).

Sufficient quantities of water for small public and industrial supplies should be available to carefully located wells in the Gettysburg Formation and the carbonate rock units. Several wells may be required to produce moderate supplies (50 to 100 gal/min) from the New Oxford Formation because only 25 percent of the nondomestic wells have reported yields exceeding 45 gal/min.

Groundwater from the Triassic age rock units is generally hard and moderately high in dissolved solids. Soft and very soft water that is low in dissolved solids is obtained from the igneous and metamorphic rocks in the South Mountain and Pigeon Hills areas. Wells located in the carbonate units produce very hard water that is high in dissolved solids.

INTRODUCTION

This report contains a comprehensive description of the groundwater resources of Adams County, Pennsylvania, where nearly 80 percent of the

water used is from underground sources. The report includes a description of the hydrologic system, an evaluation of the yield potential of the rock formations, a geologic and well location map, and data on the chemical quality of the groundwater.

This information can assist planning organizations, municipalities, well drilling firms, consulting geologists and engineers, agriculture, and industry in their efforts to efficiently develop and manage existing water and land resources. Individual homeowners, as well, can be guided as to the availability of subsurface water resources.

WATER USE

According to the State Water Plan (Pennsylvania Department of Environmental Resources, 1979, 1980), water use in the Adams County area has increased about 20 to 25 percent over the past 10 years, exclusive of irrigation. The latter use is difficult to estimate and project because it is dependent on weather conditions and varies greatly from year to year. Current planning projects indicate a continued growth in the demand for water. The State Water Plan has recommended that almost all of this increased demand be met by groundwater.

The total water withdrawn from both groundwater and surface-water sources in 1979 averaged 8.7 Mgal/d (million gallons per day), of which groundwater supplied 79 percent. The largest use of groundwater is for domestic supplies, for which the average withdrawal is about 2 Mgal/d. Groundwater use for public supplies is about 1.8 Mgal/d. Table 1 is a list of public water suppliers.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the cooperation and help of homeowners and company officials who granted them access to their property for the collection of data essential to this study. The U. S. Geological Survey provided complete access to their data files, for which the authors are grateful. Eichelberger Well Drilling, Inc. is to be thanked for providing 7-1/2-minute topographic map locations for the many wells they have drilled in the county.

HYDROLOGIC SYSTEM

Water enters the hydrologic system in Adams County as precipitation or streamflow, and leaves as water vapor to the atmosphere (evapotranspiration), overland runoff, or groundwater discharge to streams. A large part of the water entering the system moves out of the county within a few days.

Table 1. *Public Water Suppliers in Adams County*

Name	Existing sources (as of October 1980)
Abbottstown Borough	5 wells (Ad-72, -95, -434); 4 springs
Arendtsville Borough	2 wells (Ad-153, -154); 2 spring fields
Aspers Water Company	3 wells (Ad-158, -159, -258); 13 springs (Sp-8)
Bendersville Borough	3 wells (Ad-160, -161, -259); 3 springs (Sp-9)
Keystone Water Company (Biglerville)	4 wells (Ad-164, -165, -166, -394)
Bonneauville Borough	3 wells (Ad-266, -268, -269)
Charnita Water and Improvement Association	1 well (Ad-265)
East Berlin Borough	3 wells (Ad-134, -135, -136)
Fairfield Municipal Authority	1 well (Ad-346); Maple Spring Run
Franklin Twp. Water Authority (Cashtown)	1 well (Ad-260); 2 springs (Sp-10, -11)
Gettysburg Municipal Authority	3 wells (Ad-174, -270, -252); Marsh Creek
Lake Heritage Utilities, Inc.	2 wells (Ad-261, -262)
Lake Meade Utilities, Inc.	2 wells (Ad-263, -264)
Littlestown Borough	10 wells (Ad-178, -200, -201, -202, -203, -204, -205, -207, -209, -210); quarry
New Oxford Municipal Authority	2 wells (Ad-83, -436); South Branch of Conewago Creek
York Springs Borough	3 wells (Ad-155, -156, -157); 1 spring

Except for a small amount held in surface bodies (lakes and ponds) and retained as soil moisture, water that remains for longer periods percolates through the subsurface material and is eventually discharged to streams of the Conewago, Mountain, Toms, Middle, Marsh, Rock, and Alloway Creek basins. The latter five basins drain most of the southern part of the county and eventually flow into the Potomac River, whereas Conewago and Mountain Creeks flow into the Susquehanna River.

Groundwater has a significant role in the system because about 20 percent of the precipitation infiltrates to the water table and slowly moves down gradient from areas of recharge. Eventually, groundwater returns to the land surface and is discharged to streams through springs and seepage in and adjacent to stream channels. The average annual recharge (and discharge) is an approximate estimate of the maximum amount of groundwater available for consumptive use. In Adams County, this amounts to about 380,000 $(gal/d)/mi^2$ (gallons per day per square mile). Consumptive use of groundwater causes a corresponding reduction in the baseflow of streams; groundwater use in excess of average recharge will cause a progressive lowering of groundwater levels.

Figure 1 shows diagrammatically the hydrologic cycle for Adams County. The variations and magnitude of each component in the cycle determine the availability of water. The amount of streamflow entering the county is very small and thus is not shown on the diagram.

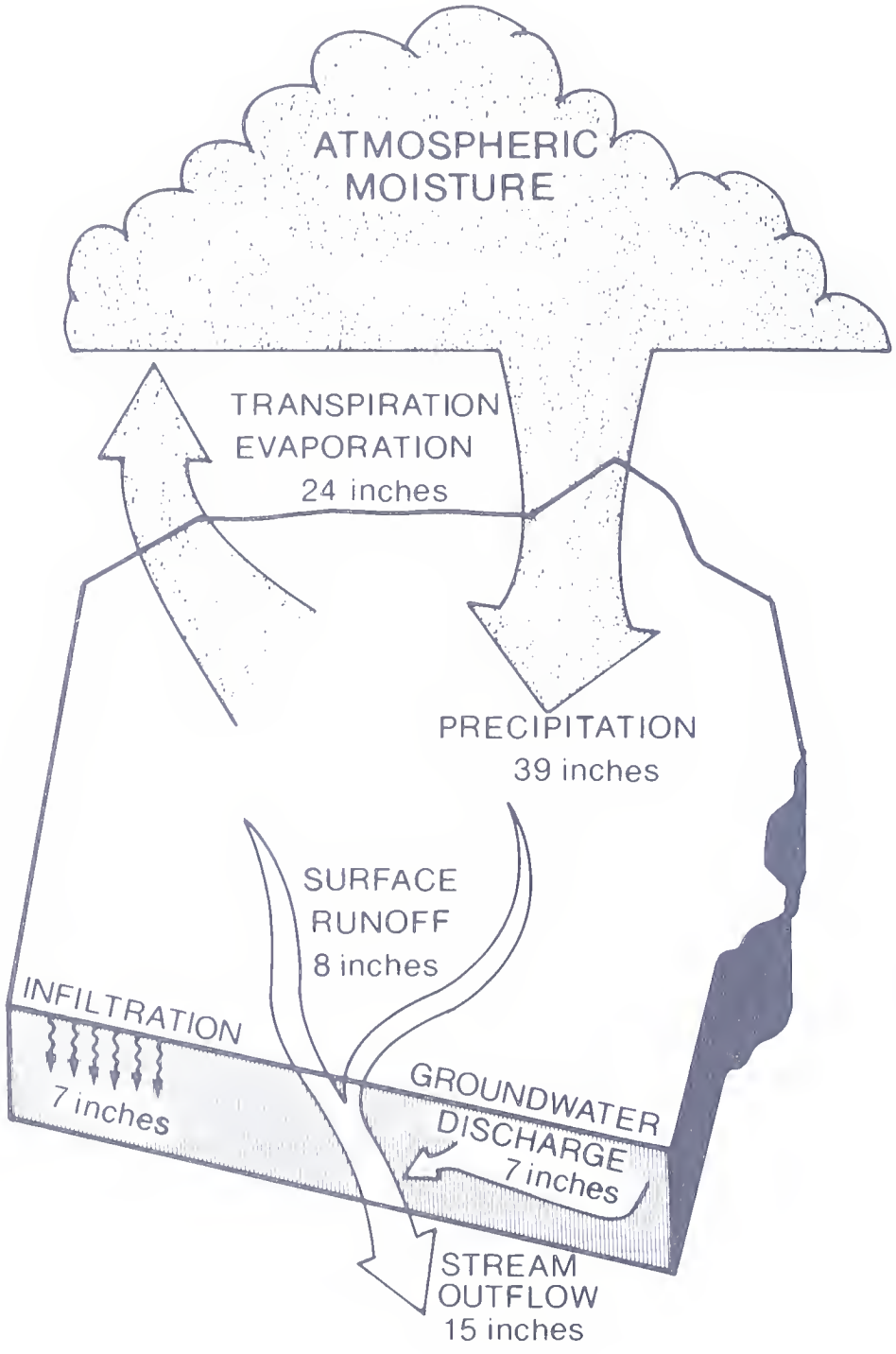

Figure 1. The annual hydrologic cycle for Adams County. (To convert inches to gallons per day, multiply inches × 47,520 × area in square miles.)

PRECIPITATION

Normal annual precipitation at Gettysburg for the period 1941–1970 is 39.29 inches. Average precipitation varies from month to month but is, in general, evenly distributed throughout the year (Figure 2). The South Mountain area receives, on the average, more precipitation (about 44 inches) than the remainder of the county; most of the county receives an amount equivalent to that measured at Gettysburg.

EVAPOTRANSPIRATION

Evapotranspiration is a collective term that describes evaporation from water bodies, wetted surfaces, and moist soil in combination with vapor that escapes from living plants by the process of transpiration. The amount of evapotranspiration varies with the length of the growing season, the aver-

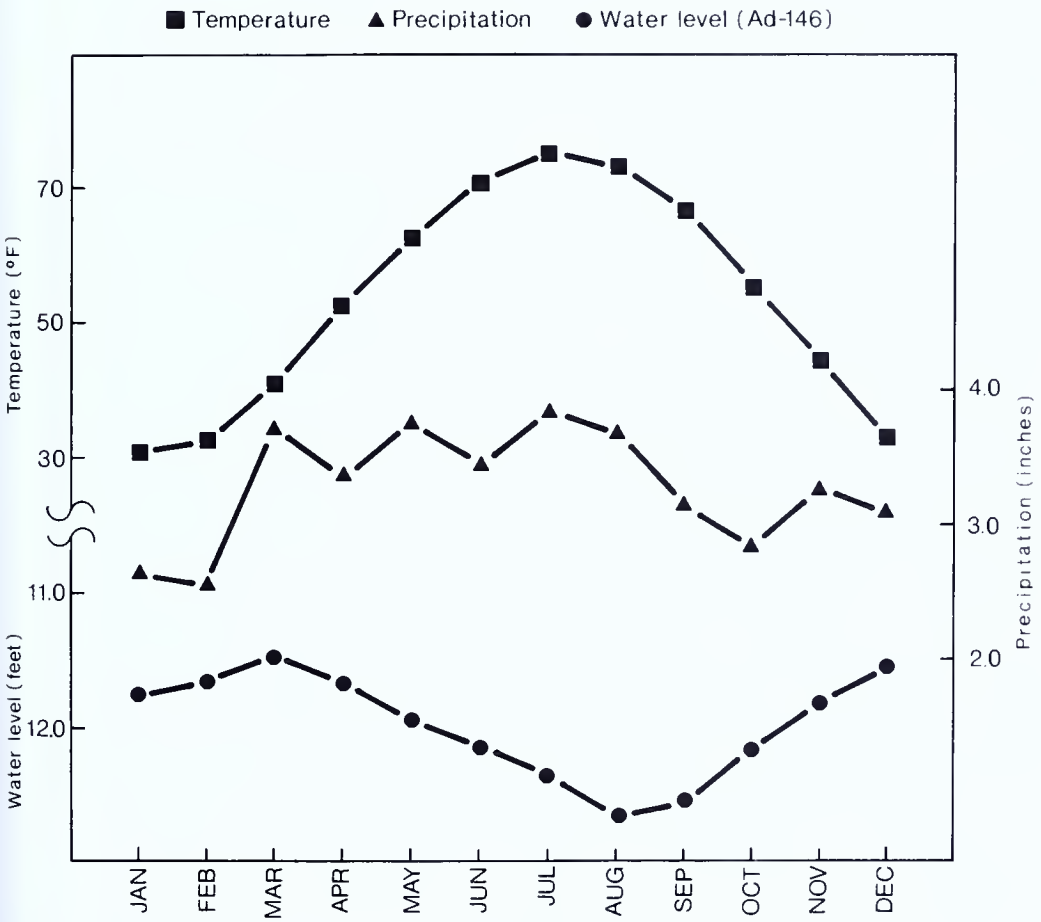

Figure 2. Mean temperature and precipitation at Gettysburg, and mean water level in well Ad–146.

age temperature, the amount and timing of precipitation, and other climatological factors.

The effect of evapotranspiration on recharge to and discharge from the groundwater reservoir is shown in Figure 2. Declining water levels occur when discharge from the groundwater reservoir exceeds recharge; rising water levels indicate the reverse. There is a continuous decline in water level from March through August even though precipitation is somewhat higher on the average than during the remainder of the year. This demonstrates the effectiveness of plants in not allowing precipitation to reach and thus recharge the water table during the growing season. Recharge begins near the end of the growing season and reaches a maximum after the first killing frost in October. The groundwater reservoir is generally fully recharged by December.

The average annual water loss to evapotranspiration in the county is about 24 inches. Under normal conditions this represents about 61 percent of precipitation. However, during dry years, such as in 1954, when only 32.88 inches of precipitation was recorded at Gettysburg, as much as 70 to 75 percent may be lost.

STREAMFLOW AND BASEFLOW

Annual discharge from streams in the county accounts for about 14.8 inches of the annual precipitation on the area. Discharges range from about 15.6 inches in the West Conewago basin to approximately 14.3 inches in the Toms and Piney Creek basins.

About 6 inches of annual runoff in the West Conewago basin is baseflow—the groundwater contribution to streamflow (Wood, 1980). Data are not available to estimate the amount of baseflow in the remaining major drainage basins in the county. However, estimates from nearby areas and other geologic considerations suggest that the average baseflow should be slightly higher in the southeastern part of the county and about the same (6 inches) in the remainder.

AREAL GROUNDWATER YIELDING CAPABILITY

The groundwater discharge per unit of land surface is a practical estimate of the limits of development of the underlying aquifers. Areas having high natural discharge (baseflow) will generally sustain high rates of groundwater withdrawal. The West Conewago basin is primarily underlain by Triassic sedimentary rocks. Thus the 6 inches of average annual baseflow is the approximate upper limit of groundwater development in these rocks. This equates to about 200 (gal/min)/mi^2 (gallons per minute per square mile) or about 98 Mgal/d from the entire Triassic aquifer in the county.

The carbonate rocks, although limited in areal extent and largely undeveloped, represent a significant potential for future groundwater development. It is estimated that about 400 (gal/min)/mi^2 may be available from the carbonates, or a total of about 12 Mgal/d.

HYDROGEOLOGY

GEOLOGIC SETTING

Most of the county is a rolling lowland underlain by Triassic age sedimentary rocks (Figure 3). These rocks consist primarily of relatively nonresistant red shale and sandstone and minor amounts of limestone. Structurally, the rock layers form a monocline having a predominantly northwesterly dip of about 15 to 35 degrees. In many areas the lowland is broken by ridges and hills formed by diabase dikes and sheets that were intruded into the sedimentary rocks during late Triassic time.

The South Mountain area (Figure 4) occupies much of the western and northwestern part of the county. The mountains have a maximum elevation

Figure 3. View of the Triassic Lowland, looking east.

Figure 4. East flank of South Mountain at Fairfield.

of 1,800 to 2,200 feet above sea level or 1,300 to 1,600 feet above the lowlands. This area is underlain primarily by metamorphosed rhyolite and basalt of Precambrian age and Cambrian quartzite, slate, and phyllite. There are also a few areas of Paleozoic limestone along the eastern flank of South Mountain—the largest area is north of Fairfield.

The southeastern part of the county is also underlain by Precambrian and Cambrian rocks. The Pigeon Hills (Figure 5) rise a few hundred feet above the lowland and are primarily underlain by metabasalt, quartzite, and slate. Carbonate rocks occupy the northeast-southwest-trending lowland around McSherrystown, and metamorphic schist, quartzite, and conglomerate are exposed in the extreme southeastern corner of the county.

GEOLOGIC AND WATER-BEARING CHARACTERISTICS OF THE ROCK UNITS

The geologic and water-bearing characteristics of the rock units in Adams County are summarized in Table 2. Plate 1 shows the areal distribution of the units and the locations of wells utilized in the analysis of the water-bearing properties.

Table 3 gives the frequency distribution of reported well yields and the specific capacity for each rock unit. The ability of a well to yield water is

Figure 5. Pigeon Hills, looking southeast from Cross Keys.

generally estimated by the driller at the time the well is completed by measuring the rate at which water must be removed from the well in order to lower the water level near the bottom of the well; the withdrawal rate obtained is in this report called the reported yield. There are several factors that limit the accuracy of this yield estimate, two of which are: 1) as the yield increases it becomes increasingly difficult to lower the water level near the bottom of the well; and 2) the tests are generally of short duration (1 hour or less).

The reported yields are valuable, however, in evaluating the suitability of a rock unit for the development of the quantities of groundwater required for a specific use. For example, rock units in which 25 percent of the wells have reported yields greater than 100 gal/min (gallons per minute) are probably suitable for the development of industrial and municipal supplies. The Gettysburg and Conestoga Formations are in this category. Rock units in which 25 percent of the wells have reported yields less than 3 gal/min will frequently require supplemental storage to meet minimum domestic needs (either well bore storage or surface tanks). Rock units in this category are diabase, metabasalt, and metarhyolite.

A more accurate measure of a well's yielding capability is made by pumping the well at a constant rate and measuring the amount that the water level has been lowered after a given time; this is called the specific capacity (discharge divided by drawdown). Most of the specific-capacity data presented in this report are based on pumping-test results reported by drillers and con-

Table 2. *Geologic and Water-Bearing Characteristics of the Rock Units*

System	Geologic unit	Character of strata	Water-bearing characteristics
Triassic	Diabase	Medium- to coarse-grained, dark-gray rock composed mainly of plagioclase feldspar, pyroxene, and accessory magnetite; massive, hard; dark gray on fresh surface but weathers gray or light buff.	Yields small supplies of water that are marginally adequate to inadequate for domestic use; many wells will require supplemental storage to meet minimum needs; water is generally hard; overall quality is commonly poor because of shallow circulation system in aquifer.
	Gettysburg Formation	Primarily poorly bedded red shale containing interbeds of medium- to fine-grained, red sandstone; shale altered to dark-red-purple to purple argillite near contact with intrusive diabase; coarse quartz conglomerate in a matrix of red sand and limestone conglomerate in a red calcareous matrix occur locally.	Reported yields range from 1 to 630 gal/min; the median for domestic and nondomestic wells is 12 gal/min and 69 gal/min, respectively; water is generally hard; median hardness is 171 mg/L; quality is predominantly good.
	New Oxford Formation	Red shale, sandstone, and mudstone having many interspersed beds of light-colored micaceous sandstone, arkose, and conglomerate; conglomerate and arkosic beds are more common in lower 3,000 feet.	Reported yields range from 1 to 100 gal/min; several wells may be required to locate a well capable of producing moderate supplies (small public and industrial); water is generally hard; over 25 percent of the samples do not meet recommended limits for iron and manganese.
Ordovician	Beekmantown Group	Medium-gray, finely laminated limestone and some white to pink marble and earthy gray limestone in the lowland east of South Mountain around Fairfield. Primarily white or gray marble, some of which is coarsely crystalline and veined with calcite near York Springs.	Probably a fair to good aquifer that yields moderate to large quantities of very hard water.
Ordovician and Cambrian	Conestoga Formation	Chiefly thin-bedded, very impure, dark-gray limestone having some light-gray banding and graphitic shale partings; black to dark-gray shale and very impure limestone at base.	Reported yields range from 5 to 350 gal/min; the medians for domestic and nondomestic wells are 26 and 28 gal/min, respectively; water is very hard.

Cambrian	Ledger Formation	Coarse-grained gray dolomite and pure, white and light-gray marble.	Limited areal extent; probably good aquifer that yields moderate quantities of very hard water.
	Kinzers Formation	Dark-gray to medium-gray, sandy limestone, white marble, limestone having variable composition, and dark-gray shale and earthy limestone.	Reported yields range from 4 to 20 gal/min; the median is 10 gal/min for domestic wells; water is generally very hard; median hardness is 274 mg/L.
	Tomstown Formation	Primarily gray dolomite and limestone; considerable interbedded shale in the lower part.	Limited areal extent; probably a good aquifer that yields moderate quantities of very hard water.
	Vintage Formation	Pure, fine-grained, medium-gray limestone at top; lower part is chiefly knotty dolomite.	Limited areal extent, probably similar to Tomstown Formation above.
	Antietam Formation	Chiefly coarse-grained, quartzose sandstone; lower part is dense resistant quartzite, in places bluish to pink; upper part is granular, white to pinkish sandstone containing numerous fossil *Scolithus* tubes.	Yields small supplies of moderately soft water.
Cambrian	Harpers Formation	Graywacke siltstone and graywacke having a prominent interval of medium- to thick-bedded, medium-grained quartzite; subordinate dark-colored phyllite.	Reported yields range from 5 to 25 gal/min; the median for domestic wells is 10 gal/min; water is generally hard, having a median hardness of 120 mg/L.
	Weverton Formation	Sequence of quartz phyllites, quartzose graywackes, and quartzites.	Yield is likely to be low because of topographic position as a ridge former in the South Mountain area.
	Chickies Formation	Chiefly hard, white, *Scolithus*-bearing quartzite; basal beds contain coarse conglomerate, arkose, and black slate.	Yields small supplies of very soft water to drilled wells.
	Loudoun Formation	Dark-gray, dusky-blue, or very dusky red purple phyllites locally interbedded with fine-grained, laminated graywacke.	No data; yield to wells is likely to be low.
Probably Lower Paleozoic	Marburg Schist	Chiefly bluish-gray to silvery-green, fine-grained schist; beds of quartzite and conglomerate form the upper part of the formation.	The median reported yield of three domestic wells is 9 gal/min; field analyses indicate that water is very soft.

Table 2. *(Continued)*

System	Geologic unit	Character of strata	Water-bearing characteristics
Precambrian	Metabasalt	Characteristically green, greenish-gray, and gray, massive, well-cleaved rock of uniformly fine to medium grain.	Twenty-five percent of domestic wells have yields less than 3 gal/min; supplemental storage may be needed in many wells to meet minimum domestic needs; water is moderately soft.
	Metarhyolite	Mainly hard, dense, fine-grained rock of purplish color, in part containing isolated crystals of feldspar and quartz; also occurs in a large variety of colors—bluish purple, blue gray, brick red, buff, and light green are characteristic.	Same as metabasalt above.
	Greenstone schist	Greenish-gray, lustrous phyllite and schist; some is finely banded, light greenish gray, dusky yellow green, and grayish yellow green.	Limited areal extent; wells are likely to produce small quantities of soft water.

Table 3. *Summary of Water-Yielding Capability of Rocks*

		Specific capacity[1] (gal/min)/ft				Reported yield[1] (gal/min)			
Rock unit	Type[2]	Number of wells	25 Percent	50 Percent (median)	75 Percent	Number of wells	25 Percent	50 Percent (median)	75 Percent
Diabase	D	18	0.24	0.14	0.06	51	12	8	3
	N	2	—	.06	—	12	20	8	2
Gettysburg Formation	D	64	.44	.18	.08	128	20	12	8
	N	44	2.3	1.00	.36	60	150	69	30
New Oxford Formation	D	4	—	.07	—	12	17	6	5
	N	2	—	.16	—	8	45	30	8
Beekmantown Group	D			No wells					
	N			No wells					

Conestoga Formation	D	4	—	1.06	—	6	145	26	6
	N	8	35	2.58	.33	13	60	28	20
Ledger Formation	D			No data					
	N			No wells					
Kinzers Formation	D	4	—	.06	—	5	15	10	5
	N			No data					
Tomstown Formation	D			No wells					
	N	—	—	—	—	1	—	10	—
Vintage Formation	D	1	—	.04	—	1	—	5	—
	N			No wells					
Antietam Formation	D	2	—	.06	—	2	—	4	—
	N	—	—	—	—	1	—	3	—
Harpers Formation	D	2	—	.07	—	7	16	10	5
	N	—	—	—	—	2	—	20	—
Weverton Formation	D			No wells					
	N			No wells					
Chickies Formation	D	—	—	—	—	2	—	4	—
	N			No wells					
Loudoun Formation	D			No wells					
	N			No wells					
Marburg Schist	D	2	—	.47	—	3	—	9	—
	N			No wells					
Metabasalt	D	1	—	.23	—	10	15	5	3
	N			No wells					
Metarhyolite	D	2	—	.16	—	37	12	8	3
	N	2	—	.24	—	11	42	30	18
Greenstone Schist	D	—	—	—	—	1	—	9	—
	N			No wells					

[1] Value exceeded by indicated percentage of wells.

[2] D, domestic; N, nondomestic.

sultants. A few tests were conducted by the U. S. Geological Survey. Most of the tests were performed on wells in the Gettysburg Formation (Figure 6), because it underlies the largest portion of the county and has the greatest potential for groundwater development.

Figure 6. Gettysburg Formation along the railroad at the west end of the city of Gettysburg.

Specific capacities of nondomestic wells in the Gettysburg area are about five times larger than specific capacities of domestic wells. Part of the difference is due to the fact that the nondomestic wells are, on the average, deeper and penetrate more water-bearing zones than the domestic wells. Also, almost twice the percentage of nondomestic wells are in valley locations as compared to domestic wells, and wells located in valleys generally have higher specific capacities than those in other topographic settings.

Table 4 lists median and maximum casing lengths and water-level depths. A summary of well completion data is useful in making predrilling estimates and in comparing well construction characteristics among the rock units. For example, the difference between the median depths of domestic wells in the Triassic rock units and the remaining units indicates that adequate yields are obtained at much shallower depth and therefore at lower cost from the Triassic rocks.

Table 4. *Summary of Well, Casing, and Water-Level Depths*

Rock unit(s)	Type[1]	Number of wells	Well depth (feet)		Number of wells	Casing depth (feet)		Number of wells	Depth to water (feet)	
			Median	Maximum		Median	Maximum		Median	Maximum
Diabase	D	55	125	600	48	30	86	41	15	80
	N	11	140	750	4	20	22	3	6	8
Gettysburg	D	139	155	900	112	37	209	90	20	100
Formation	N	62	249	655	47	34	202	54	16	112
New Oxford	D	68	104	601	10	46	100	46	12	57
Formation	N	12	249	550	6	23	65	10	20	70
Beekmantown	D				No wells					
Group	N				No wells					
Conestoga	D	7	200	423	5	30	85	5	22	31
Formation	N	13	340	474	8	30	100	9	6	25
Ledger	D	1	—	60	1	—	50	1	—	33
Formation	N				No wells					
Kinzers	D	6	289	424	5	15	91	5	27	52
Formation	N	2	398	400	1	—	395	2	75	90
Tomstown	D				No wells					
Formation	N	1	—	247	—	—	—	—	—	—
Vintage	D	1	—	310	1	—	30	1	—	36
Formation	N				No wells					
Antietam	D	2	128	128	1	—	26	2	30	32
Formation	N	1	—	400	1	—	30	1	—	30
Harpers	D	8	118	185	4	21	44	7	20	40
Formation	N	2	361	510	1	—	18	1	—	16
Weverton	D				No wells					
Formation	N				No wells					
Chickies	D	2	235	350	2	50	59	1	—	40
Formation	N				No wells					

Table 4. *(Continued)*

Rock unit(s)	Type[1]	Number of wells	Well depth (feet) Median	Well depth (feet) Maximum	Number of wells	Casing depth (feet) Median	Casing depth (feet) Maximum	Number of wells	Depth to water (feet) Median	Depth to water (feet) Maximum
Loudoun	D				No wells					
Formation	N				No wells					
Marburg	D	3	125	140	3	40	55	3	31	40
Schist	N				No wells					
Metabasalt	D	11	142	563	10	39	44	7	44	59
	N				No wells					
Metarhyolite	D	37	200	600	35	42	63	19	22	70
	N	11	163	320	10	37	66	3	2	11
Greenstone	D	1	—	145	1	—	28	—	—	—
schist	N				No wells					
Triassic	D	218	125	900	128	36	209	140	17	100
sedimentary rocks	N	74	249	655	53	32	202	64	17	112
Cambrian and	D	28	172	424	20	28	91	23	27	52
Ordovician rocks	N	17	350	510	10	30	395	12	15	90
Igneous and	D	107	145	600	97	39	86	70	18	80
metamorphic rocks	N	22	161	750	14	35	66	6	4	11

[1] D, domestic; N, nondomestic.

FACTORS THAT INFLUENCE THE YIELDS OF WELLS

Lithology

The kind of rock is more important than any other factor in determining well yield. For example, the median specific capacity of nondomestic wells drilled in Triassic sedimentary rocks, primarily interbedded sandstone and shale, is 1.0 (gal/min)/ft (gallons per minute per foot). Contrast this value to the median specific capacity of the carbonate units, 2.6 (gal/min)/ft, and to the median of the igneous and metamorphic rocks, 0.15 (gal/min)/ft. If the same drawdown is assumed, then the carbonate rocks have slightly more than 2½ times the groundwater yielding potential of the Triassic sedimentary rocks, and about 17 times the yielding potential of the igneous and metamorphic rocks.

Diabase (Figure 7) is one of the poorest aquifers in the county. Anyone planning a well into diabase locations, as shown on the accompanying geologic map, should be forewarned of a possible inadequate water supply from such a well. Wood (1980) found that because the diabase is such a poor aquifer, dikes and sheets of this rock tend to act as barriers to groundwater movement.

Figure 7. Diabase at Little Round Top in the Gettysburg Battlefield National Park.

Topography

Topographic position affects the yields of wells in most aquifers. In general, wells located in valleys have higher yields than those located on hillsides and hilltops. Valleys and draws form where the rocks are most susceptible to physical or chemical weathering, due largely to the existence of fractures and voids in the rocks. Hilltops form on the more resistant rocks, which commonly contain few fractures or voids. Valleys are also the collecting areas through which all upslope water must drain and, therefore, have the capability for transmitting greater amounts of water per unit volume of rock than topographically higher positions.

Wood (1980) found that domestic wells in the Gettysburg Formation and diabase have greater yields in valleys than on hillsides. Industrial and public-supply wells showed little or no relationship between specific capacity and topographic position; this may be due, in part, to the relatively high median well depth of public and industrial wells.

Becher and Taylor (in preparation) found that topography has a large influence on well yields of carbonate rocks in Franklin County, Pennsylvania. The specific capacity of valley wells was found to be about 11 times higher than that of hillside wells and about 22 times higher than that of hilltop wells.

Depth of Water-Bearing Zones

The yield of a well depends largely on the size and distribution of water-bearing zones open to the well. These zones or openings may be fractures, bedding-plane partings, or small voids between the grains that make up the rock. The deeper the zone, the greater the amount of available drawdown, and thus the higher the potential well yield. For example, a zone that has a specific capacity of 1 gal/min for each foot of drawdown if penetrated 50 feet below the water table could yield a maximum of 50 gal/min. A zone having the same yielding characteristics (1 (gal/min)/ft) located 100 feet below the water table could produce a maximum of 100 gal/min.

Yielding zones in the igneous and metamorphic rocks are generally quite shallow. Few zones were reported at depths greater than 300 feet, and most were within 100 feet of the surface. The deepest water-bearing zone reported in igneous rocks is 583 feet in a very low yielding well in diabase. In general, however, if sufficient quantities of water for the desired use have not been obtained within the first 250 to 300 feet of drilling, it would be better to move to a new site rather than attempt to deepen the well.

Water-bearing zones deeper than 300 feet were reported in 18 wells in the Triassic sedimentary rocks; the deepest was at 768 feet. Well Ad–270 obtains more than half of its yield of 150 gal/min from zones below 500 feet. Thus depths greater than 500 feet should be considered when maximum

yields are desired. Wood (1980) suggests that if the need is great enough, the drilling of wells deeper than 1,000 feet may be justified.

According to Becher and Taylor (in preparation), the optimum depth for domestic wells in carbonate rocks has been reported to be about 200 feet in Franklin County. They stated that nearly dry holes that encounter only fresh rock to 200 feet are unlikely to encounter water at greater depths because most yield zones are at shallow depths. Data on depth to water-bearing zones in the carbonate rocks in Adams County are extremely limited and no general conclusions can be made. The deepest reported zone is at a depth of 340 feet.

Geologic Structure

Geologic structure, which includes faults, folds, fractures, and orientation of the rock layers (bedrock dip), often exerts an important influence on the yield of wells. Detailed knowledge of local structure can be a valuable aid in the selection of high-yield well sites. Plate 1 shows the major structural features in Adams County as well as some site-specific information on the orientation of the bedrock layering.

Fractured bedrock will yield more water to wells than nonfractured bedrock. Many valleys and depressions are localized along fractures or fracture zones; thus wells located in these settings will have a high probability of penetrating fractured bedrock. Other features that are reported to be good indicators of fractured bedrock are faults and fracture traces (natural linear features observed on aerial photographs).

Well yields generally decrease with increasing dip of strata. This probably occurs for two reasons: 1) more of the openings that normally occur along bedding (bedding-plane partings) will be penetrated by a well in nearly horizontal strata than in steeply inclined strata, and 2) the cone of depression that develops when a well is pumped will spread more easily in flat-lying strata.

Detailed discussions of the relationship of geologic structure to well yield in rocks present in, or similar to, those in Adams County may be found in reports by Becher and Taylor (in preparation), Lloyd and Growitz (1977), and Wood (1980).

WATER QUALITY

Table 5 summarizes the field determinations of specific conductance, hardness, and pH of water from the aquifers. The source and significance of these properties of groundwater are presented in Table 6.

Measurements of specific conductance (an electrical measure of the mineral content in solution) give a good approximation of the dissolved-solids content in the water. To calculate the approximate dissolved solids,

Table 5. *Summary of Field Water-Quality Measurements*

Rock unit(s)	Type[1]	Number of wells	Median hardness (mg/L)	Number of wells	Median pH	Number of wells	Median specific conductance (micromhos)
Diabase	D	24	154	2	6.5	23	320
	N	4	180	—	—	4	445
Gettysburg Formation	D	54	188	13	7.5	48	420
	N	40	154	26	7.4	24	462
New Oxford Formation	D	21	154	7	7.3	27	375
	N	7	137	6	7.4	6	387
Beekmantown Group	D			No wells			
	N			No wells			
Conestoga Formation	D	4	205	2	7.4	3	425
	N	11	205	6	7.8	10	415
Ledger Formation	D	1	222	1	7.4	1	700
	N			No wells			
Kinzers Formation	D	5	274	3	7.2	5	1000
	N			No data			
Tomstown Formation	D			No wells			
	N			No data			
Vintage Formation	D	1	274	1	7.4	1	560
	N			No wells			
Antietam Formation	D	2	68	—	—	2	188
	N			No wells			

Harpers Formation	D	4	120	2	6.6	7	270
	N	1	154	—	—	1	400
Weverton Formation	D			No wells			
	N			No wells			
Chickies Formation	D	1	17	—	—	1	50
	N			No wells			
Loudoun Formation	D			No wells			
	N			No wells			
Marburg Schist	D	3	34	3	5.7	3	60
	N			No wells			
Metabasalt	D	6	85	—	—	6	197
	N			No wells			
Metarhyolite	D	18	51	—	—	17	162
	N	3	51	3	6.8	—	—
Greenstone schist	D	1	34	—	—	1	130
	N			No wells			
Triassic	D	80	171	21	7.4	79	400
sedimentary rocks	N	47	154	32	7.4	30	450
Cambrian and	D	21	154	9	7.2	20	398
Ordovician rocks	N	12	205	6	7.8	11	400
Igneous and	D	52	85	5	5.8	50	206
metamorphic rocks	N	7	120	3	6.8	4	445

[1] D, domestic; N, nondomestic.

Table 6. *Source and Significance of Selected Dissolved Constituents and Properties of Groundwater*[1]

(Concentrations in milligrams per liter (mg/L) except as indicated)

Constituent or property	Source or cause	Significance[2]
Silica (SiO_2)	Dissolved from practically all rocks and soils (commonly less than 30 mg/L).	Forms hard scale in pipes and boilers. When carried over in steam of high pressure boilers it forms deposits on blades of turbines.
Iron (Fe)	Dissolved from practically all rocks and soils. May also be derived from iron pipes, pumps, and other equipment.	On exposure to air, iron in groundwater oxidizes to reddish-brown precipitate. More than about 0.3 mg/L stains laundry, porcelain, and utensils reddish brown. Objectionable for food processing, textile processing, beverages, ice manufacturing, brewing, and other processes. Maximum limit recommended for drinking water is 0.3 mg/L.
Manganese (Mn)	Dissolved from many rocks and soils. Often found associated with iron in natural waters but not as common as iron.	More than 0.2 mg/L precipitates upon oxidation. Manganese has the same undesirable characteristics as iron but is more difficult to remove. Maximum limit recommended for drinking water is 0.05 mg/L.
Calcium (Ca) and magnesium (Mg)	Dissolved from practically all rocks and soils, especially from limestone, dolomite, and gypsum.	Cause of most of the hardness, and in combination with bicarbonate is the cause of scale formation in steam boilers, water heaters, and pipes (see hardness). Water low in calcium and magnesium is desired in electroplating, tanning, dyeing, and in textile manufacturing.
Sodium (Na) and potassium (K)	Dissolved from practically all rocks and soils. Sewage and industrial wastes are also major sources.	Concentrations of less than 50 mg/L have little effect on the usefulness of water for most purposes. More than 50 mg/L may cause foaming in steam boilers.
Bicarbonate (HCO_3) and carbonate (CO_3)	The bicarbonate ion may result from atmospheric carbon dioxide and the solution of carbon dioxide produced during the decomposition of organic matter in the soil. The major source, however, is from the solution of limestone.	Bicarbonate and carbonate produce alkalinity. Bicarbonates of calcium and magnesium decompose in steam boilers and hot-water facilities to form scale and release corrosive carbon dioxide gas (see hardness).

Sulfate (SO_4)	Dissolved from rocks and soils containing gypsum, iron sulfides, and other sulfur compounds. Commonly present in some industrial wastes and sewage.	Sulfates in water containing calcium may form hard calcium sulfate scale in steam boilers. The maximum limit recommended for drinking water is 250 mg/L.
Chloride (Cl)	Dissolved from rocks and soils in small quantities. Relatively large amounts are derived from sewage, industrial wastes, and highway salting practices.	In large quantities chloride increases the corrosiveness of water. Large amounts in combination with sodium will give a salty taste. Maximum limit recommended for drinking water is 250 mg/L.
Fluoride (F)	Dissolved in small to minute quantities from most rocks and soils.	About 1.0 mg/L of fluoride in drinking water is believed to be helpful in reducing the incidence of tooth decay in small children; larger concentrations cause mottling of enamel. It is recommended that fluoride not exceed 1.7 mg/L where the 5-year average of daily maximum air temperature is 53.0 to 53.7°F.
Nitrate (NO_3)	Decaying organic matter, sewage, and fertilizers are principal sources.	Small concentrations have no effect on usefulness of water. Most groundwater contains less than 10 mg/L. Water containing more than 45 mg/L may cause methoglobinemia (a disease often fatal in infants) and, therefore, should not be used in infant feeding. Maximum limit recommended for drinking water is 45 mg/L.
Hardness (as $CaCO_3$)	In most water nearly all the hardness is due to calcium and magnesium. All of the metallic cations other than the alkali metals also cause hardness. There are two classes of hardness—carbonate (temporary) and noncarbonate (permanent). Carbonate hardness refers to the hardness resulting from cations in association with carbonate and bicarbonate; it is called temporary because it may be removed by boiling the water. Noncarbonate hardness refers to that resulting from cations in association with other anions.	Hardness consumes soap before a lather will form and deposits soap curds on bathtubs. Carbonate hardness is the cause of scale formation in boilers, water heaters, radiators, and pipes, causing a decrease in heat transfer and restricted flow of water. Water having a hardness up to 60 mg/L is considered soft; 61 to 120 mg/L, moderately hard; 121 to 180 mg/L, hard; more than 180 mg/L, very hard. Milligrams per liter divided by 17.1 yields the concentration in grains per gallon.

Table 6. *(Continued)*

Constituent or property	Significance[2]
Dissolved solids	A measure of all the chemical constituents dissolved in a particular water. The maximum limit recommended for drinking water is 500 mg/L, but water containing up to 1,000 mg/L may be used where less mineralized supplies are not available.
Specific conductance (micromhos at 25 °C)	A measure of the capacity of a water to conduct an electrical current. It varies with concentration and degree of ionization of the constituents. May be used to obtain a rapid estimate of the approximate dissolved-solids content of water.
pH	The negative logarithm of the hydrogen-ion concentration. A pH of 7.0 indicates neutrality of a solution. Values higher than 7.0 denote alkaline solutions; values lower than 7.0 indicate acidic solutions. Corrosiveness of water generally increases with decreasing pH. The pH of most natural waters ranges between 6 and 8.
Temperature	The temperature of groundwater that occurs between the water table and about 60 feet below the water table is approximately the same as the average annual air temperature (Lovering and Goode, 1963, p. 5); below this point, groundwater temperatures increase with depth about 1 °F for each 50 to 100 feet.

[1] From Lloyd and Growitz (1977), p. 51-54.
[2] Maximum recommended limits are from U. S. Environmental Protection Agency (1975, 1977).

multiply the specific conductance by 0.6. Based upon this calculation, water from the Kinzers Formation has a median dissolved-solids content higher than the recommended limit set by the U. S. Environmental Protection Agency (1977) (the standard is 500 mg/L, which is equivalent to a conductance of 833 micromhos). Median values for water from the remaining rock units are all within EPA (Environmental Protection Agency) recommendations.

Field data indicate that water from the Triassic rock units is generally hard. Soft and very soft water is available from the igneous and metamorphic rocks in the South Mountain area and in the Pigeon Hills. Wells in the carbonate units will produce very hard water. The inset map on Plate 1 shows the general distribution of water hardness in the county.

Values of pH are only slightly above or below the neutral value of 7.0 for most of the rock units. The Marburg Schist and most of the units in the South Mountain area have relatively low pH values. Low pH combined with low hardness is often indicative of water that may be corrosive to plumbing.

Fifty-four laboratory analyses of the major chemical constituents in water from 51 wells and 3 springs are summarized in Table 7. The analyses were obtained from the files of the U. S. Geological Survey and from the public water supply records of the Pennsylvania Department of Environmental Resources.

Maximum allowable concentrations in water from public-supply wells, as defined in the National Interim Primary Drinking Water Regulations of the U. S. Environmental Protection Agency (1975), are exceeded by one or more constituents in 15 of 51 samples analyzed. The most common problem constituents are iron and manganese. Iron concentrations exceeded or equaled the limit in 7 samples. High levels of iron and manganese in water do not present a health hazard—the limit is set for the purpose of avoiding, in household water use, problems associated with precipitates and stains that form because oxides of these metals are relatively insoluble.

Water from three wells exceeds the EPA permissible limit for nitrates. Excessive concentrations of nitrates have the potential to harm infant human beings and livestock if consumed on a regular basis. Over half of the samples have nitrate levels greater than normal expected background. These levels are probably the result of man's activities in the area and, although not high enough to be a problem, may be indicative of other types of man-produced pollution. Potential sources of nitrates in groundwater are crop fertilizers, cattle feedlots, barnyard wastes, and on-lot sewage disposal systems.

Table 7. *Median Concentration of Dissolved Constituents in Groundwater*

(Concentrations are in milligrams per liter unless otherwise indicated)

Formation or aquifer	Number of samples[1]	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (N)	Dissolved solids	Total hardness (as $CaCO_3$)	Specific conductance (micromhos)
Diabase	2	43.5	0.13	0.02	41.5	22.5	4.5	0.4	141.5	51.5	8.7	0.1	6.0	274	277	300
Gettysburg Formation	27	20	.07	0	64	15	14	1.1	190	37.5	6	0	2.2	263	172	450
New Oxford Formation	15	19	.10	.03	48.5	12	17	1.2	165	27	17.5	.05	6.0	310	161	336.5
Conestoga Formation	1	8.9	1.6	.08	38	9.4	3.8	1.8	124	8.1	9.0	.1	8.9	—	134	425
Kinzers Formation	2	9.0	.035	.005	76	29.5	32.5	1.55	302.5	22	77	.0	3.55	—	311	755
Antietam Formation	1	14	.55	.07	24	9.0	4.2	2.0	88	25	6.9	.0	.8	—	97	205
Harpers Formation	1	7.8	.25	0	8.6	4.8	12	1.2	18	3.9	26	.2	2.7	—	41	160
Marburg Schist	1	8.1	.28	.10	3.6	3.2	1.3	.2	34	1.1	1.6	.2	.02	—	22	55
Metarhyolite	4	—	.005	0	7.4	2.7	—	—	25.4	8.0	.5	.63	.75	98	38	—

[1] The total number of samples analyzed; the number of actual analyses for each constituent varies.

MANAGEMENT OF WATER SUPPLIES

PROTECTION FROM OVERDRAFT

Available data do not indicate any area in Adams County where there is a progressive decline in water levels as a result of overpumping. Only a small fraction of the total groundwater available for use is currently being used.

The major problem with overdraft is in individual or closely spaced wells located in the Triassic rock units. Wells yielding as much as 100 to 300 gal/min can often be developed in fractured parts of these rocks. However, the overall aquifer has a lower storage capacity than most rocks in the Commonwealth (Wood, 1980). Because wells in such an environment are unable to draw water from storage over a large area, when heavy pumping is necessary during periods of little recharge (as during the growing season), large drawdowns in wells and dewatering of the adjacent bedrock result. As the bedrock is dewatered, the well yields will decline considerably—to as little as one third their normal capacity. Thus, there are frequent water shortages—almost annually—in water-supply systems that base their yield on "normal" conditions and do not provide sufficient excess capacity.

PROTECTION FROM POLLUTION

The chief chemical contaminant identified in this study is nitrate; it is derived from septic tanks, cesspools, barnyard wastes, and overfertilization of fields. Prevention of this type of pollution requires the following: 1) adequate casing of wells and proper spacing between wells and septic tanks; 2) more stringent control on the installation of septic systems and design of animal feedlots; and 3) use of proper procedures in the application of fertilizers.

CONCLUSIONS

Wells can be constructed to supply a sufficient amount of water for domestic use throughout much of the county. However, in diabase, metabasalt, and metarhyolite, many wells have reported yields of less than 3 gal/min. Supplemental water storage to meet minimum domestic needs may be required in areas underlain by these units (see geologic map).

Sufficient quantities of water for small public and industrial supplies should be available to carefully located wells in the Gettysburg Formation and the carbonate units, although the latter have not been extensively tested. The drilling of several wells may be required to locate a well capable of producing moderate supplies in the New Oxford Formation, as only 25 percent of the inventoried nondomestic wells have reported yields exceeding

45 gal/min. Additionally, the yield of a typical well in the Triassic aquifers may be relatively high when initially drilled, but it may decrease markedly as the aquifer around the well is dewatered. The long-term yield of a well is commonly no more than one half to one third of the test yield (Wood, 1980).

The Triassic aquifers and the carbonate aquifers discharge an average of 200 (gal/min)/mi^2 and 400 (gal/min)/mi^2 of water, respectively, to streams. If only 25 percent of the discharge were developed from widely spaced wells, about 28 Mgal/d could be obtained without seriously affecting groundwater levels or streamflow. These amounts are over three times the total water use in 1979.

SOURCES OF INFORMATION ABOUT WATER

A variety of information on water supplies is available from the government agencies listed below. When requesting information, it is important to give an accurate location of the site for which you wish information.

The Pennsylvania Department of Environmental Resources, Bureau of Topographic and Geologic Survey, has information on the geology of Adams County and has published reports that describe in detail the rocks that underlie the county. Well drillers' logs and reports on new wells that have been drilled in the county are also available at the Survey's office in Harrisburg.

The Division of Water Quality, Bureau of Water Quality Management, and the Bureau of Community Environmental Control, Pennsylvania Department of Environmental Resources, Harrisburg, can supply information on well construction requirements for public supplies and recommendations for domestic supplies, biological reports on well water, and the chemical quality of groundwater. The bureaus, through various regional offices, test water samples for bacterial pollution. The bureaus can also advise effective corrective measures when pollution is reported.

The Bureau of Resources Programming, Pennsylvania Department of Environmental Resources, Harrisburg, has information on stream discharges, flood data, reservoir requirements, power plant discharges, and water use.

The Pennsylvania Public Utility Commission, Bureau of Rates and Research, Harrisburg, has information on some municipal water supplies, including source, average daily use, total annual use, and estimated future needs.

The U. S. Geological Survey office in Harrisburg has data on wells, springs, and streams, and on the chemical quality of water.

Local well drillers and pump installers usually can provide prices and sug-

gest the type of equipment needed to develop a water supply. They can also suggest the proper well diameter for the necessary pumping equipment. Pump installers can supply information concerning the size of the pump, depth of the pump setting, and the pressure-tank capacity.

If the chemical analysis of the well water indicates treatment is necessary, commercial water-treatment companies can provide the necessary information and equipment.

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GLOSSARY

Aquifer. A formation that yields significant quantities of water to wells and springs.

Base flow. Discharge entering stream channels as flow from the groundwater reservoir; the fair-weather flow of streams.

Carbonate rocks. Roeks composed dominantly of carbonate minerals. Limestone and dolomite are the most common rocks of this type.

Dip. The angle at which a formation or bed is inclined from the horizontal, measured at a right angle to the strike or trend of the formation or bed.

Discharge, groundwater. The process by which water is removed from the saturated zone; also the quantity of water removed.

Drawdown. The lowering of the water level in a well caused by pumping.

Evapotranspiration. Water withdrawn from a land area by direct evaporation from water surfaees and moist soil and by plant transpiration.

Fault. A fracture or fracture zone along which there has been displaeement of the two sides relative to eaeh other. The displaeement may be a few inches or many miles.

Formation. A fundamental unit in rock-stratigraphic classifieation. It is a body of rock having uniform eharacteristies; it is generally tabular and is mappable at the earth's surface or traceable in the subsurface.

Fracture. A break in rocks.

Groundwater reservoir. An aquifer or a group of related aquifers under a given area.

Hardness. A chemical property of water, caused mostly by the presenee of calcium and magnesium, which increases the amount of soap needed to produce a lather. Water that has a hardness, calculated as grains per gallon of calcium carbonate, less than 3.5 is soft; between 3.5 and 7.0 is moderately hard; between 7.1 and 10.5 is hard; and greater than 10.5 is very hard. Values may be converted to milligrams per liter by multiplying by 17. Hardness values used in this report were determined in the field by use of a Calgon Speedy kit for testing water hardness. (Use of a brand name is for identification purposes only and does not imply endorsement by the Pennsylvania Geological Survey.)

Igneous rock. A rock that solidified from molten material.

Metamorphic rock. A rock derived from preexisting rocks by a change in mineral composition or texture caused by heat and/or pressure.

Overdraft. An excessive lowering of the water level or artesian head in an aquifer caused by excessive withdrawal.

Permeability. The capacity of a material to transmit a fluid.

pH. A number that indicates the degree of acidity or alkalinity of water. A pH of 7.0 indicates neutrality of a solution. Values higher than 7.0 denote alkaline solutions; values lower than 7.0 indicate acidic solutions.

Porosity. The ratio of the volume of interstices in a rock to its total volume, expressed as a percentage.

Primary openings. Openings or voids existing when the rock was formed. In sedimentary rocks, openings result from the shape and nature of the original sediment and the way the particles are fitted together.

Recharge, groundwater. The process by which water is added to the saturated zone; also, the quantity of water added.

Runoff. That part of the precipitation that appears in streams. It is the same as streamflow unaffected by diversions, dams, or other works of man.

Saturated zone. The zone in which interconnected interstices are saturated with water.

Secondary openings. Voids produced in rocks subsequent to their formation by solution, weathering, or breaks in the rock.

Specific capacity. The yield of a well, in gallons per minute, divided by the drawdown of water level in the well, in feet.

Specific conductance. A measure of the capacity of water to conduct an electrical current. It varies with concentration and degree of ionization of the constituents.

Stream-gaging station. A gaging station where a record of discharge of a stream is obtained. Within the U. S. Geological Survey this term is used only for those gaging stations where a continuous record of discharge is obtained.

Surface water. Water on the surface of the earth.

Transpiration. The process by which vapor escapes from the living plant, principally the leaves, and enters the atmosphere.

Water table. The upper surface of the zone of saturation, or that zone in which openings in permeable rocks are filled with water.

TABLE 8. RECORD OF WELLS

Well location: The number is that assigned to identify the well. It is prefixed by a two-letter abbreviation of the county. The latitude and longitude (lat-long) are the coordinates in degrees and minutes of the southeast corner of a 1-minute quadrangle within which the well is located.

Use: C, commercial; D, dewatering; H, household; I, irrigation; N, industrial; P, public; R, recreation; S, stock; T, institutional; U, unused.

Topographic setting: F, flat surface; H, hilltop; S, hillside; V, valley; W, draw; T, terrace; U, undulating.

Aquifer: Trd, diabase; Trg, Gettysburg Formation; Trn, New Oxford Formation; OCc, Conestoga Formation; Cl, Ledger Formation; Ck, Kinzers Formation; Ct, Tomstown Formation; Cv, Vintage Formation; Ca, Antietam Formation; Ch, Harpers Formation; Cch, Chickies Formation; Xwm, Marburg Schist; mb, metabasalt; mr, metarhyolite; vs, greenstone schist.

Lithology: cgca, calcareous conglomerate; cgq, quartz conglomerate; cgs, sandy conglomerate; dm, dolomite; igc, coarse-grained igneous rock; igf, fine-grained igneous rock; ls, limestone; mtc, coarse-grained metamorphic rock; mtf, fine-grained metamorphic rock; sh, shale; ss, sandstone.

Static water level: Depth--F, flows but head is not known; +, measurement is in feet above land surface. Date--month/last two digits of year.

Reported yield: gpm, gallons per minute.

Specific capacity: gpm/ft, gallons per minute per foot of drawdown.

Hardness: gpg, grains per gallon.

Specific conductance: Micromhos at 25 degrees Celsius.

TABLE

Well location		Owner	Oriller	Date completed	Use	Alti-tude of land surface (feet)	Topo-graphic setting	Aquifer lithol
Number	Lat-Long							
Ad- 1	3943-7705	L. J. Ounkin	---	1960	H	608	S	Trn/--
4	3943-7706	Holman Sell	---	1906	U	560	V	Trn/--
5	3943-7706	do.	---	---	H	560	V	Trn/--
8	3943-7707	W. F. Crouse	---	---	R	560	S	Trn/--
16	3943-7943	William Fisel	---	1933	H	510	S	Trn/--
18	3943-7708	Russell Moser	---	1954	---	554	S	Trn/--
19	3943-7708	do.	---	1930	H	554	S	Trn/--
20	3943-7708	Holman Sell	---	1921	U	542	S	Trn/--
23	3943-7710	David Yealy	---	1940	H	528	V	Trn/--
25	3943-7711	C. M. A. Shildt	---	1950	U	516	H	Trn/--
26	3943-7711	do.	---	---	H	516	H	Trn/--
27	3944-7708	Richard Shoemaker	Mummert & Sterner	1961	H	---	H	Trn/--
28	3944-7710	Hoffmans Orphanage	---	1915	T	572	S	Trg/sh
31	3945-7705	A. L. Mehring Estate	---	1946	H	---	S	Trn/--
33	3945-7706	A. A. Straley	---	---	H	560	H	Trn/--
34	3945-7706	Harry Weisel	---	---	U	562	S	Trn/--
35	3945-7708	Carl Zeigler	---	1942	U	555	F	Trn/--
37	3945-7709	Sydney Yingling	John S. Funt	1961	H	570	F	Trn/--
38	3946-7707	J. L. Cool	William W. Reichart	1957	H	580	S	Trn/--
40	3946-7709	Schuchart Petroleum Co.	A. C. Reider	---	U	561	S	Trn/--
43	3946-7710	William Meyers	C. G. Fair, Jr.	1952	U	495	S	Trn/--
45	3947-7704	Marvin Nolf	A. C. Reider & Son, Inc.	---	U	590	V	Trn/--
46	3947-7704	Aaron Bange	---	---	H	613	S	Trn/--
50	3948-7705	John Hartlaub	---	1960	U	585	S	Trn/--
52	3948-7705	Mrs. Ruth Naylor	---	---	H	563	S	Trn/--
54	3948-7706	L. W. Wagaman	---	1957	H	625	S	Trn/--
60	3948-7707	Leroy Harner	William W. Reichart	1947	H	621	H	Trn/--
61	3948-7708	E. E. Hartlaub	Harrisburg's Kohl Bros.	1960	H	597	V	Trg/ss
62	3948-7708	Bernard Claybough	C. G. Fair, Jr.	1951	H	600	H	Trg/ss
64	3949-7702	Ralph Miller	William W. Reichart	---	U	530	S	Trn/--
66	3950-7702	Mrs. Margaret Wagner	Harrisburg's Kohl Bros.	1960	H	598	S	Trn/--
69	3950-7703	N. S. Beaver	---	---	S	573	S	Trn/--
72	3951-7700	Abbottstown Water Co.	Harrisburg's Kohl Bros.	1952	P	620	S	Trn/--
74	3951-7700	S. G. Slaybaugh	do.	1961	H	610	S	Trn/--
75	3951-7701	Charles Bryer	---	---	U	580	W	Trn/--
76	3951-7701	Charles Hartlaub	Harrisburg's Kohl Bros.	1958	H	600	W	Trn/--
77	3951-7701	J. H. Shank	do.	1955	P	642	T	Trn/--
79	3951-7701	do.	do.	1956	P	642	H	Trn/--
80	3951-7701	Philip Eisenhart	William W. Reichart	1935	H	606	H	Trn/--
82	3951-7701	K. L. Kapp	Harrisburg's Kohl Bros.	1960	H	598	S	Trn/--
83	3951-7703	New Oxford Bor.	A. C. Reider	1950	U	561	F	Trn/--
84	3951-7703	do.	Harrisburg's Kohl Bros.	1947	P	490	V	Trn/--
85	3951-7704	John Riddell	A. C. Reider	1956	H	522	V	Trn/--
86	3951-7704	do.	---	1938	H	519	S	Trn/--
89	3951-7705	Ellis Miller	---	1907	U	540	S	Trn/--
92	3951-7705	M. J. Smith	C. G. Fair, Jr.	1960	P	585	S	Trn/--
95	3952-7659	Abbottstown Water Co.	Harrisburg's Kohl Bros.	1957	P	555	S	Trn/--
96	3952-7700	John Bair	---	1935	H	545	S	Trn/--
97	3952-7701	Brethren Home Inc.	Harrisburg's Kohl Bros.	1937	U	588	S	Trn/--
98	3952-7701	do.	do.	1953	U	588	S	Trn/--
99	3952-7701	J. H. Brady	---	---	H	572	S	Trn/--
100	3953-7701	C. E. Roach	York Orilling Co., Inc.	1960	H	548	F	Trn/--
101	3952-7701	Ralph Hankey	do.	1960	H	553	S	Trn/--
102	3952-7701	John and Francis Moore	A. C. Reider	1934	H	580	S	Trn/--
104	3952-7702	Vernon Lehr	Harrisburg's Kohl Bros.	1960	H	545	W	Trn/--
107	3952-7702	Thomas Kiser	Mummert & Sterner	1956	U	545	F	Trn/--
108	3952-7702	do.	John S. Funt	1959	H	---	F	Trn/--
109	3952-7702	do.	do.	1959	H	---	F	Trn/--
110	3952-7702	Woodrow Martz	Harrisburg's Kohl Bros.	1960	H	558	S	Trn/--
111	3952-7703	C. F. Geisler	do.	1961	H	510	S	Trn/--
113	3953-7702	Sara Hoover	do.	---	S	545	S	Trn/--
116	3953-7702	G. C. Chronister	do.	1955	H	544	S	Trn/--
118	3953-7702	R. A. Lemmon	do.	1957	H	568	H	Trn/--
119	3953-7702	Roscoe Yingling	A. C. Reider & Son, Inc.	1958	H	568	H	Trn/--
120	3953-7702	Paul Prutzman	do.	1958	H	569	H	Trn/--
121	3953-7702	do.	Mummert & Sterner	---	U	569	H	Trn/--
122	3953-7702	Roy Snyder	---	1960	P	568	H	Trn/--
123	3954-7658	Adams County Fair Grounds	---	---	O	510	S	Trn/--
124	3954-7658	do.	---	---	H	525	S	Trn/--
126	3954-7702	Lloyd Hoff	Harrisburg's Kohl Bros.	1956	H	530	S	Trn/--
127	3954-7702	Luther Myers	do.	1956	H	533	S	Trg/sh
128	3954-7702	do.	---	---	---	534	S	Trg/sh
130	3955-7659	Dr. Joseph Eshleman	Harrisburg's Kohl Bros.	1960	H	400	T	Trn/sh
134	3956-7659	P. C. Brown	do.	---	H	420	S	Trn/--
135	3956-7659	East Berlin Bor.	do.	1946	P	413	V	Trn/--
136	3956-7659	do.	do.	1927	U	529	S	Trg/sh
137	3956-7659	do.	do.	1927	P	527	S	Trg/sh

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tal pth low nd face et)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Oepth (feet)	Oiameter (inches)		Oepth below land surface (feet)	Oate measured (mo/yr)						
78	---	6	---	57	7/60	---	---	---	---	---	Ad- 1
40	---	6	---	15	8/60	---	---	---	---	---	4
54	---	---	---	18	5/61	---	---	---	---	---	5
--	---	6	---	---	1947	---	---	8	355	7.2	8
00	---	6	---	12	8/60	---	---	10	430	---	16
68	---	6	---	24	8/60	---	---	---	---	---	18
65	---	6	---	---	---	---	---	15	700	---	19
62	---	---	---	8	8/60	---	---	---	320	---	20
65	---	6	---	12	---	---	---	5	210	6.2	23
35	---	5	---	17	7/60	---	---	---	---	---	25
60	---	---	---	---	---	---	---	---	---	---	26
20	---	6	---	16	---	---	0.04	6	260	7.8	27
60	---	6	---	40	---	---	---	---	---	---	28
14	---	6	---	42	8/60	---	---	---	---	---	31
23	---	4	---	9	7/60	---	---	---	---	---	33
30	---	4	---	7	7/60	---	---	---	---	---	34
64	---	6	---	5	7/60	---	---	---	---	---	35
60	---	6	---	18	7/61	---	---	---	---	---	37
27	---	---	---	7	---	---	---	---	---	---	38
05	61	---	---	3	4/68	6	---	9	375	---	40
08	---	6	---	11	---	---	---	7	320	---	43
61	---	6	---	19	8/60	---	1.0	9	375	7.9	45
42	---	5	---	9	8/60	---	---	12	380	---	46
07	---	5	---	9	8/60	---	---	9	505	6.7	50
65	---	6	---	---	8/60	---	---	14	550	---	52
96	---	6	---	---	8/57	---	---	20	1110	---	54
47	---	6	---	8	8/60	---	---	---	---	---	60
86	---	6	---	5	11/60	---	---	---	---	---	61
97	---	6	---	10	10/51	---	---	12	540	7.4	62
87	---	6	---	22	9/60	---	---	---	---	---	64
00	---	6	---	4	12/60	---	0.07	---	---	---	66
35	---	6	---	---	---	---	---	26	950	6.6	69
50	12	8	---	48	7/62	20	---	---	---	---	72
82	---	6	---	5	---	---	---	7	315	7.3	74
00	---	5	---	20	9/60	---	---	---	---	---	75
15	---	6	---	21	7/58	---	---	---	---	---	76
08	---	6	---	70	2/55	---	---	---	---	---	77
49	---	6	---	20	---	---	---	---	---	---	79
95	---	---	---	---	---	---	---	---	---	---	80
71	---	6	---	9	9/60	---	---	9	380	---	82
69	27	---	---	---	---	18	---	---	---	---	83
00	15	---	---	30	11/48	45	---	9	394	7.5	84
48	---	8	---	20	9/56	---	---	8	---	---	85
80	---	6	---	---	---	---	---	---	---	---	86
85	---	6	---	19	---	---	---	---	---	---	89
82	---	6	---	----	3/60	---	---	7	350	---	92
00	31	6	---	11	9/57	27	---	6	---	7.7	95
50	---	6	---	---	---	---	---	---	380	---	96
37	---	8	---	---	---	17	---	---	---	---	97
00	25	6	---	---	---	6	---	---	---	---	98
90	---	6	---	---	---	---	---	---	---	---	99
81	---	5	---	+1	9/60	---	---	---	---	---	100
39	---	6	---	F	9/60	---	---	---	---	---	101
60	---	6	---	---	---	---	---	---	---	---	102
41	---	6	---	9	7/60	---	---	---	---	---	104
57	---	6	---	---	---	---	---	---	---	---	107
46	---	6	---	---	---	---	---	---	---	---	108
02	---	6	---	---	---	---	---	---	---	---	109
13	---	6	---	9	11/60	---	0.07	4	159	---	110
85	---	5	---	8	5/61	---	---	---	---	---	111
17	---	---	---	F	9/60	---	---	---	---	---	113
62	---	6	---	---	---	---	---	---	760	---	116
15	---	6	---	17	10/57	---	---	---	400	---	118
00	---	6	---	---	---	---	---	---	---	---	119
10	---	6	---	---	---	---	---	---	390	---	120
47	---	6	---	8	9/60	---	---	---	---	---	121
38	---	6	---	15	5/61	---	0.04	12	540	7.3	122
83	---	6	---	17	5/61	---	---	---	---	---	123
33	---	---	---	---	5/61	---	---	---	---	---	124
40	---	6	---	3	3/56	---	---	10	350	---	126
35	---	6	---	30	2/56	---	---	---	---	---	127
00	---	---	---	---	---	---	---	---	---	---	128
75	---	6	---	14	12/60	---	---	---	355	7.4	130
01	---	10	---	34	1945	---	---	---	445	---	134
00	13	8	---	10	10/46	100	---	8	380	7.0	135
00	---	8	---	58	10/57	28	.08	11	535	---	136
56	---	8	---	50	1927	45	.65	11	495	---	137

TABLE 8.

Well location		Owner	Oriller	Oate completed	Use	Alti-tude of land surface (feet)	Topo-graphic setting	Aquifer/ lithology
Number	Lat-Long							
Ad-138	3956-7659	E. A. Oeily	William W. Reichart	1949	H	417	V	Trn/---
139	3956-7659	Melvin Meyers	Robert 5. Toomey & 5ons	1953	H	530	H	Trg/sh
140	3956-7659	do.	---	1928	5	530	H	Trg/sh
143	3956-7659	M. L. Boyer	---	1927	H	460	5	Trg/sh
145	3956-7659	Paul Anthony	---	1928	H	510	H	Trg/sh
146	3958-7704	U. 5. Geol. 5urvey	Eichelberger Well Orilling, Inc.	1967	U	540	V	Trg/ss
147	4049-7713	Gettysburg Bor.	---	1882	U	605	5	Trd/igc
148	4049-7713	do.	O. E. Miller	1883	U	607	H	Trd/igc
153	3955-7718	Arendtsville Bor.	Harrisburg's Kohl Bros.	1941	P	760	5	Trg/sh
154	3955-7718	do.	do.	1956	P	750	5	Trg/sh
155	4000-7707	York 5prings Bor.	---	---	P	735	S	Trg/cgs
156	4000-7707	do.	Harrisburg's Kohl Bros.	1955	P	735	S	Trg/cgs
157	4000-7706	do.	do.	---	P	615	S	Trg/sh
158	3959-7714	Aspers Water Co.	---	1928	P	855	S	mr/---
159	3959-7713	do.	Harrisburg's Kohl Bros.	1954	P	660	V	Trg/cgs
160	3958-7716	Bendersville Bor.	do.	1941	P	940	V	mr/---
161	3958-7716	do.	do.	1955	P	955	V	mr/---
162	3956-7715	Biglerville Water Co.	---	1913	U	830	5	Trg/cgs
163	3956-7715	do.	---	1913	U	795	V	Trg/cgs
164	3956-7715	do.	---	---	P	800	S	Trg/cgs
165	3955-7715	do.	Harrisburg's Kohl Bros.	1950	P	665	V	Trg/sh
166	3955-7715	do.	do.	1960	P	685	V	Trg/sh
167	4001-7712	G. O. Haycock	Merle L. Gayman	1966	H	970	S	mr/igf
168	3945-7723	C. G. Rist	Austin R. Keyser, Inc.	1966	U	760	5	mb/---
170	3947-7716	Gettysburg Munic. Auth.	Harrisburg's Kohl Bros.	1930	P	465	V	Trg/sh
171	3946-7724	Fairfield Munic. Auth.	---	1962	P	720	5	Ch/---
172	3947-7722	Gettysburg 5hoe Co.	---	---	U	605	V	Trg/cgca
173	3949-7714	Gettysburg Munic. Auth.	---	---	U	580	5	Trg/sh
174	3949-7714	do.	Kohl Bros., Inc.	1966	P	560	5	Trg/sh
175	3948-7714	U. 5. Park 5ervice	---	---	U	605	V	Trd/igc
177	3949-7714	do.	---	---	U	550	V	Trg/sh
178	3945-7705	Littlestown Munic. Auth.	A. C. Reider	1949	U	580	5	OCc/---
179	3945-7705	do.	do.	1949	P	580	5	OCc/---
180	3950-7700	William Hardy	Harrisburg's Kohl Bros.	1966	H	625	5	Ck/sh
181	3950-7700	Charles Huff	Mummert & 5terner	1967	H	705	H	Cch/mtc
182	3951-7700	Maurice Myers	---	1930	H	580	5	Ca/mtc
183	3951-7700	do.	Harrisburg's Kohl Bros.	1961	H	585	5	Ca/mtc
184	3951-7700	A. A. Miller	do.	1958	H	610	F	Trn/---
185	3950-7700	Harry Jacoby	do.	1964	H	560	5	Ck/ls
186	3950-7700	do.	do.	1964	U	560	5	Ck/ls
187	3950-7701	Vance 5chuler	---	1965	H	535	S	Cl/dm
188	3949-7702	Bethlehem Steel Corp.	---	---	H	510	5	Ck/ls
189	3949-7702	Jesuit Farms	William W. Reichart	1959	H	518	5	Ck/ls
190	3948-7702	Claude Murren	---	---	H	542	S	OCc/ls
192	3947-7704	Martin Grove	Mummert & 5terner	1959	H	585	H	Ck/ls
193	3946-7703	John Grove	do.	1965	H	545	5	OCc/ls
194	3949-7701	Bethlehem 5teel Corp.	---	1960	H	542	H	Cv/dm
198	3945-7701	Hanover 5hoe Farms	A. C. Reider & 5on, Inc.	1952	H	625	5	Ch/mtf
199	3946-7702	do.	William W. Reichart	---	H	565	H	OCc/ls
200	3945-7705	Bor. of Littlestown	Harrisburg's Kohl Bros.	1965	U	575	5	OCc/ls
201	3944-7704	do.	---	1941	P	610	H	OCc/ls
202	3944-7704	do.	---	1941	P	610	H	OCc/ls
203	3944-7704	do.	---	---	P	605	5	OCc/ls
204	3944-7704	do.	---	1915	P	600	5	OCc/ls
205	3944-7704	do.	A. C. Reider & 5on, Inc.	1940	P	600	5	OCc/ls
206	3944-7704	do.	do.	1932	U	---	S	OCc/ls
207	3944-7704	do.	do.	1941	P	640	5	Ch/mtf
208	3944-7706	do.	Harrisburg's Kohl Bros.	1967	P	618	5	OCc/ls
209	3944-7706	do.	do.	1967	P	600	5	OCc/ls
210	3944-7704	do.	do.	1967	U	620	H	Ca/mtc
212	3943-7704	Mark Trostle	Weldo W. Funt	1964	H	705	H	Ch/mtf
213	3946-7702	Hanover Munic. Water Works	---	1931	P	545	V	OCc/ls
214	3946-7702	do.	---	1931	P	545	V	OCc/ls
215	3946-7702	do.	---	1931	P	542	V	OCc/ls
216	3946-7701	do.	---	1931	P	542	V	OCc/ls
217	3943-7705	Mike Bradley	---	1964	H	642	H	Ch/mtf
218	3934-7704	Elmer Outtera	William W. Reichart	1966	H	685	H	Ch/mtf
219	3944-7702	R. E. Hancock	do.	1960	H	710	5	Ch/mtf
221	3944-7700	T. P. Ounchack	Mummert & 5terner	1969	H	780	H	Xwm/mtf
222	3945-7702	Bessie Mathias	do.	1966	H	622	5	Ch/mtf
223	3944-7701	Eugene 5ines	---	---	H	682	5	Ch/mtf
224	3943-7701	Otto Sells	Mummert & 5terner	1969	H	805	H	Xwm/mtf
225	3943-7700	George Watt	do.	1969	H	775	H	Xwm/mtf
226	3948-7700	Conewago Oairy	A. C. Reider	---	C	610	H	OCc/ls
227	3951-7717	Benjamin Binder	---	---	U	585	5	Trd/igc
228	4000-7712	Musselman Canning Co.	---	---	U	820	5	mr/---

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Total depth below land surface (feet)	Casing		Oepth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
	Depth (feet)	Oiameter (inches)		Oepth below land surface (feet)	Oate measured (mo/yr)						
96	---	6	---	---	---	3	---	2	125	---	Ad-138
120	---	6	---	---	---	7	---	---	---	---	139
144	---	6	---	---	---	---	---	14	710	---	140
74	---	6	---	---	---	---	---	7	380	---	143
200	---	6	---	---	---	---	---	---	---	---	145
100	---	6	---	13	---	13	---	11	400	---	146
100	---	12	---	50	---	---	---	---	---	---	147
100	---	12	---	30	---	25	.39	5	---	6.6	148
115	60	6	---	4	1941	80	1.5	---	---	---	153
125	73	6	---	10	2/56	97	1.1	4	---	6.2	154
104	44	6	---	---	---	30	---	4	---	7.0	155
90	49	6	---	65	3/55	30	---	5	---	6.7	156
200	---	8	---	F	3/64	150	.91	5	185	5.9	157
110	---	8	---	---	---	20	---	---	---	---	158
500	34	6	---	9	2/54	21	.12	6	---	6.6	159
152	28	6	40;80	---	---	80	---	---	---	---	160
77	37	6	---	2	6/55	42	---	---	---	---	161
80	---	6	---	---	---	10	---	---	---	---	162
210	---	10	---	F	6/76	8	---	---	---	---	163
230	---	6	---	---	---	20	---	5	175	6.5	164
250	19	6	---	30	11/50	20	.12	5	---	8.2	165
250	41	6	80;230	15	6/60	68	.80	6	---	7.6	166
145	43	6	80;145	42	11/66	8	---	---	---	---	167
563	18	6	---	25	11/67	---	---	---	---	---	168
550	---	12	---	3	7/54	630	3.3	57	---	7.3	170
212	18	6	---	16	1962	24	---	---	---	---	171
71	---	6	---	7	11/67	---	---	---	---	---	172
348	---	---	---	52	3/63	185	1.4	7	---	7.0	173
500	47	8	180;200;220; 397	50	10/66	183	1.2	8	450	7.7	174
26	9	48	---	14	11/67	---	---	---	---	---	175
499	32	8	---	59	9/68	180	1.2	9	---	7.8	177
80	15	10	---	---	---	300	---	---	---	---	178
80	15	10	---	---	---	350	---	11	---	7.8	179
130	91	6	60;125	18	8/66	20	---	---	---	---	180
120	59	6	94	40	5/69	5	---	1	50	---	181
128	---	6	59	28	5/69	4	.037	5	205	---	182
128	26	6	40;123	45	5/69	5	0.09	3	170	---	183
117	100	6	50;112	24	10/58	24	---	2	75	---	184
278	15	6	---	52	12/64	12	0.06	18	1000	7.2	185
300	18	6	---	16	5/69	4	.028	19	1150	---	186
60	50	6	---	33	5/69	---	---	13	700	7.4	187
300	---	6	---	---	---	---	---	16	1000	7.2	188
424	15	6	---	27	5/69	10	.066	9	510	---	189
30	30	48	---	22	5/69	5	---	7	325	---	190
261	20	6	---	48	5/69	5	.066	15	525	7.4	192
200	18	6	---	31	5/69	6	.056	16	560	7.5	193
310	30	6	---	36	5/69	5	0.04	16	560	7.4	194
170	---	6	---	14	5/69	10	0.06	6	260	---	198
160	---	6	---	25	5/69	8	0.11	12	425	7.2	199
400	41	6	70;280	8	10/65	43	2.02	12	---	---	200
350	---	8	---	---	---	40	---	20	700	---	201
400	---	8	---	---	---	60	---	20	725	7.0	202
193	---	8	---	---	---	9	---	17	550	7.0	203
335	100	8	---	25	8/69	14	0.10	---	---	---	204
340	---	8	---	25	---	30	---	13	480	7.7	205
200	---	8	---	---	---	---	---	---	---	---	206
510	---	8	---	---	---	17	---	9	400	---	207
474	40	6	---	20	8/69	12	1.22	12	430	8.0	208
400	59	6	68;170	6	12/67	63	0.33	12	400	7.8	209
400	30	6	108;150;170	30	6/67	3	---	---	---	---	210
75	12	6	35;65	40	8/69	10	---	3	160	6.3	212
400	22	10	---	5	9/69	27	29.0	10	360	---	213
322	29	10	---	5	9/69	27	35.1	10	365	---	214
135	32	10	---	3	9/69	28	35	8	350	---	215
429	20	10	---	5	9/69	26	3.1	12	400	---	216
135	---	6	---	25	9/69	5	.078	15	600	---	217
174	22	6	72;122;163	20	8/66	25	---	9	370	---	218
106	---	6	---	17	9/65	5	---	7	325	---	219
100	40	6	74	20	5/69	10	---	1	60	5.6	221
100	44	6	89	40	6/66	12	---	7	250	---	222
185	---	6	---	16	9/69	---	---	7	270	6.8	223
125	23	6	58;65;80	31	9/69	9	0.07	2	55	5.8	224
140	55	6	---	40	9/69	8	0.91	3	115	5.7	225
210	---	6	---	15	---	60	2.05	---	---	---	226
196	---	6	---	7	4/68	---	---	---	---	---	227
600	---	6	---	---	---	10	---	---	---	---	228

TABLE 8.

Well location		Owner	Oriller	Oate completed	Use	Alti-tude of land surface (feet)	Topo-graphic setting	Aquifer/ lithology
Number	Lat-Long							
Ad-229	4001-7708	York Springs Bor.	Harrisburg's Kohl Bros.	1955	U	695	V	Ct/---
235	3951-7703	Canning Factory	---	---	N	540	S	Trn/---
237	3951-7708	Gulden Cigar Factory	---	---	N	570	V	Trg/sh
238	3946-7709	Two Taverns	---	---	H	520	S	Trg/sh
239	3947-7711	Mr. Benner	---	---	H	520	S	Trg/sh
240	3947-7711	do.	---	---	H	500	S	Trg/sh
241	3949-7714	George Olinger	---	---	U	520	V	Trg/sh
242	3949-7714	do.	---	---	U	520	V	Trg/sh
243	3949-7714	Lutheran Seminary	---	---	U	560	H	Trg/sh
244	3950-7715	Arthur Shields	---	---	H	574	S	Trg/sh
245	3950-7715	Millers Camp	---	---	H	575	V	Trg/sh
246	3950-7716	do.	---	---	H	570	V	Trg/sh
247	3950-7716	do.	---	---	H	555	V	Trg/sh
248	3950-7716	Mr. Eck	---	---	H	550	H	Trg/sh
251	3954-7725	A. M. P. Maschmeyer	---	---	H	1265	V	mr/---
252	3948-7716	Gettysburg Munic. Auth.	Harrisburg's Kohl Bros.	1970	P	500	H	Trg/sh
253	3949-7713	Gettysburg Bor.	---	1969	U	490	S	Trg/sh
254	3949-7715	Pa. Oept. of Transp.	---	1939	U	530	H	Trg/sh
255	3947-7716	U. S. Oept. of Interior	Eichelberger Well Orilling, Inc.	1968	U	470	S	Trg/sh
256	3947-7716	Gettysburg Munic. Auth.	---	1970	U	495	H	Trg/sh
257	3951-7714	Westinghouse Elevator Co.	Weldo W. Funt	---	I	530	S	Trg/sh
258	3959-7714	Aspers Water Co.	Harrisburg's Kohl Bros.	1956	P	670	S	mr/---
259	3958-7716	Bendersville Bor.	do.	1966	P	1030	V	mr/---
260	3953-7722	Cashtown Water Co.	---	1959	P	860	V	mr/---
261	3948-7711	Lake Heritage Utilities, Inc.	Moody Orilling Co., Inc.	1965	P	500	S	Trg/sh
262	3948-7711	do.	do.	1965	P	500	S	Trg/sh
263	3958-7702	Lake Meade Utilities, Inc.	York Orilling Co., Inc.	1967	P	510	V	Trg/sh
264	3958-7702	do.	do.	1967	P	510	V	Trg/sh
265	3945-7723	Charnita Water & Improvement	Austin R. Keyser, Inc.	1966	P	583	S	Trg/cgca
266	3948-7707	J. F. Busbey	Harrisburg's Kohl Bros.	1972	I	610	V	Trn/ss
267	3948-7708	Bonneauville Bor.	York Orilling Co., Inc.	1972	U	585	V	Trg/ss
268	3948-7708	do.	Harrisburg's Kohl Bros.	1974	P	535	V	Trg/ss
269	3948-7708	do.	do.	1975	U	520	V	Trg/ss
270	3948-7716	Gettysburg Munic. Auth.	Eichelberger Well Orilling, Inc.	1976	P	475	V	Trg/sh
271	3955-7714	Kennies Food Market	John S. Funt	1975	C	620	V	Trg/sh
272	3950-7713	Columbia Gas of Pa., Inc.	---	---	U	515	S	Trg/sh
273	3950-7713	Graybills, Inc.	John S. Funt	1965	C	505	V	Trg/sh
274	3951-7714	Gettysburg Area Sch. Dist.	Harrisburg's Kohl Bros.	1960	U	522	H	Trg/sh
275	3952-7716	R. M. Shealer	B & R Well Orilling, Inc.	1975	H	660	H	Trd/igc
276	3955-7714	Inland Container Corp.	Harrisburg's Kohl Bros.	1947	U	650	V	Trg/sh
277	3955-7714	Biglerville Bor. Auth.	do.	1961	C	595	V	Trg/sh
278	3955-7714	Pet Inc.	do.	1946	N	645	V	Trg/sh
279	3955-7714	do.	do.	1945	U	600	V	Trg/sh
280	4002-7707	do.	do.	1944	U	660	S	Trd/igc
281	3955-7714	do.	do.	1941	N	625	V	Trg/sh
282	3955-7714	do.	do.	1936	N	640	V	Trg/sh
283	3955-7714	do.	do.	1937	N	630	V	Trg/sh
284	3955-7715	do.	do.	1945	N	660	V	Trg/sh
285	3955-7715	do.	do.	1946	N	655	V	Trg/sh
286	3955-7715	do.	do.	1947	N	660	V	Trg/cgs
287	3955-7715	do.	do.	1947	N	685	V	Trg/cgs
288	3955-7715	do.	do.	1950	N	680	V	Trg/cgs
289	3955-7714	do.	John Thran	1974	U	615	V	Trg/sh
290	3948-7708	Bonneauville Bor.	Harrisburg's Kohl Bros.	1976	U	550	V	Trg/ss
291	3952-7717	R. M. Welty	do.	1974	H	605	V	Trg/sh
292	3953-7715	Charles Fagnan	John S. Funt	1972	H	680	H	Trg/sh
293	3955-7718	Arendtsville Bor.	Harrisburg's Kohl Bros.	1956	U	895	S	Trg/cgs
294	3954-7716	Gerald Orner	John S. Funt	1972	H	660	V	Trg/sh
295	3958-7713	Duffy-Mott Co., Inc.	Harrisburg's Kohl Bros.	1943	N	660	S	Trg/sh
296	3958-7713	do.	do.	1951	N	665	V	Trg/cgs
297	3958-7713	do.	do.	1941	N	645	S	Trg/sh
298	3958-7713	do.	do.	1966	N	655	S	Trg/ss
299	3958-7713	do.	Eichelberger Well Orilling, Inc.	1975	N	630	S	Trg/sh
300	3958-7713	Mountain Orchard Coop., Inc.	Harrisburg's Kohl Bros.	1937	N	640	S	Trg/sh
301	3958-7713	do.	Eichelberger Well Orilling, Inc.	1963	N	620	V	Trg/sh
302	3951-7714	H. J. Keller Co.	John S. Funt	1974	N	500	V	Trg/sh
303	3951-7714	do.	do.	1974	N	505	V	Trg/sh
304	3945-7716	Gettysburg Foundry Specialties	Oenis H. Woodward	1975	N	518	H	Trd/igc

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hardness (gpg)	Specific conductance (micromhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
247	---	---	---	---	---	10	---	---	---	---	Ad-229
550	---	6	---	---	---	5	---	---	---	---	235
125	---	6	---	---	---	6	---	---	---	---	237
90	---	6	---	---	---	4	---	---	---	---	238
125	---	6	---	---	---	7	---	---	---	---	239
155	---	6	---	---	---	2	---	---	---	---	240
400	---	8	---	30	---	200	3.0	16	---	7.5	241
232	---	6	---	---	---	---	---	---	---	---	242
125	---	6	---	---	---	7	---	---	---	---	243
80	---	6	---	---	---	5	---	18	---	---	244
40	---	6	---	---	---	3	---	---	---	---	245
55	---	6	---	---	---	4	---	---	---	---	246
60	---	6	---	---	---	5	---	---	---	---	247
60	---	6	---	---	---	5	---	---	---	---	248
76	---	6	---	---	---	5	---	1	---	---	251
500	53	8	80;120;320	2	2/70	290	1.0	11	750	7.9	252
605	43	10	105;195;385; 490	15	4/69	30	.12	8	---	---	253
500	---	6	---	15	8/76	50	.12	---	---	---	254
475	14	10	160;235;260; 385	3	4/69	383	2.7	---	---	7.5	255
423	31	10	91;139;360;400	22	10/70	154	1.5	23	---	7.8	256
---	---	6	---	10	6/76	35	.49	14	560	---	257
280	14	6	20;35;245	11	11/56	30	.16	3	---	7.2	258
320	35	8	41;74	F	7/66	75	.33	3	---	6.8	259
163	38	6	---	---	---	18	---	1	---	6.8	260
346	32	6	---	24	7/65	125	1.7	---	---	7.8	261
388	32	6	---	24	7/65	125	2.8	9	---	7.4	262
240	15	8	---	4	4/67	112	.94	8	---	7.0	263
220	16	8	---	1	5/67	121	1.1	9	---	7.0	264
85	63	6	68;85	31	6/66	85	10	---	---	---	265
250	31	6	60;110	20	2/72	32	.28	12	440	7.8	266
250	43	6	---	---	---	8	.04	---	---	---	267
400	40	6	325	F	2/74	39	.20	9	---	7.8	268
500	41	6	15;280;316;395	0	10/75	18	.05	5	280	7.9	269
655	65	8	72;562;587;615	19	6/76	150	.55	---	---	---	270
170	52	6	80;140	---	---	30	---	14	---	7.3	271
204	---	8	---	10	---	---	---	---	---	---	272
126	30	6	---	9	6/76	20	---	14	575	7.7	273
155	20	6	50;150	25	10/60	12	.24	---	---	---	274
42	36	6	34	11	5/75	6	.24	10	430	---	275
620	10	8	---	70	3/47	20	---	---	---	---	276
250	31	6	---	2	4/61	70	2.1	19	630	7.7	277
600	24	8	---	100	7/46	200	---	---	---	---	278
137	---	6	---	4	6/76	82	.71	9	---	6.5	279
265	32	6	---	11	3/44	14	.16	---	---	---	280
589	29	8	---	31	6/76	200	1.0	18	575	6.9	281
511	---	8	---	47	6/76	150	4.8	24	---	6.7	282
563	---	---	---	---	---	200	---	---	---	---	283
248	14	6	---	---	---	35	---	---	---	---	284
150	22	6	---	4	7/46	45	.36	---	---	---	285
205	14	6	---	7	4/47	25	.17	---	---	---	286
495	20	6	---	5	4/47	33	.26	---	---	---	287
203	38	6	---	10	5/50	40	2.0	---	---	---	288
60	---	6	---	10	---	---	---	27	350	6.4	289
504	44	8	55;124	8	6/76	8	.02	---	---	---	290
80	57	6	65;71	0	6/76	30	.43	17	550	---	291
70	20	6	---	---	---	8	---	12	450	---	292
500	---	6	---	---	---	1	.01	---	---	---	293
170	20	6	20;110	---	---	20	---	12	440	---	294
650	12	10	---	60	---	80	3.1	46	1300	---	295
550	31	6	---	4	5/51	65	.42	8	350	---	296
575	12	6	---	---	11/41	---	1.0	---	---	---	297
600	105	8	---	60	3/66	168	1.4	20	600	7.6	298
400	68	8	123;167;210	112	9/75	310	3.8	11	---	7.6	299
560	---	6	---	20	9/37	60	.86	---	---	---	300
360	60	6	---	5	9/63	114	2.2	14	450	---	301
240	---	6	---	---	---	60	---	16	580	---	302
280	---	6	---	14	7/76	60	---	---	---	---	303
750	10	6	---	8	7/76	1	.01	---	---	---	304

TABLE 8

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/ lithology
Number	Lat-Long							
Ad-30S	394S-7716	Gettysburg Foundry Specialties	---	1969	N	500	S	Trd/igc
306	3946-771S	Joseph Eyler	Harrisburg's Kohl Bros.	1973	H	S4S	H	Trg/ss
307	3944-771S	U. S. Farm Home Admin.	do.	1973	H	480	S	Trg/ss
308	3944-7718	Rooney	Cline & Ouvall, Inc.	1973	H	SSO	S	Trd/igc
309	3944-7719	Charles Keyes	do.	1974	H	S30	H	Trg/sh
310	3944-7717	F. B. Oarcey	do.	1973	H	480	V	Trd/igc
311	39S9-7710	Gervus Currens	Eichelberger Well Orilling, Inc.	1976	H	760	S	Trg/cgs
312	4000-7707	York Springs Bor.	Harrisburg's Kohl Bros.	1948	U	720	S	Trg/cgs
313	4000-7607	do.	do.	1947	U	720	S	Trg/cgs
314	39S8-7713	Barry Showers	Frank Wilson Jr.	1973	H	6S0	H	Trd/igc
31S	39S6-7713	Clair Althoff	John S. Funt	1973	H	630	S	Trg/sh
316	39S3-7714	Glenn Wolford	Weldo W. Funt	1974	H	680	H	Trg/sh
317	39S3-7713	George Hagan	do.	1973	H	620	S	Trg/sh
318	39SS-7712	John Bowmaster	John S. Funt	1973	H	SSO	V	Trg/sh
319	39S3-7711	Robert Cleveland	Weldo W. Funt	1973	P	S60	H	Trg/ss
32D	3952-7709	M. B. Horn	John S. Funt	1974	H	S60	V	Trg/sh
321	3952-7709	Kenneth 5heaffer	do.	1974	H	S80	S	Trg/sh
322	39S5-7707	Karl Stell	William W. Reichart	1971	H	540	V	Trg/sh
323	39S1-770B	R. E. Thompson	Weldo W. Funt	1973	H	620	V	Trd/igc
324	39S1-7707	Albert Schulteis	do.	1973	H	S6S	V	Trd/igc
32S	39S1-7707	Robert Glass	do.	1973	H	560	V	Trd/igc
326	39S1-7707	Richard Miller	do.	1972	S	S60	V	Trg/sh
327	3947-770B	Edward Reichart	William W. Reichart	197S	H	S7S	H	Trn/---
328	394B-7709	Gary Crone	Weldo W. Funt	1975	U	525	S	Trg/sh
329	3948-7709	Richard Weaver	do.	1973	1	525	S	Trg/sh
330	3949-7711	O. P. Kuhn	do.	1973	H	S4S	S	Trg/sh
331	3949-7710	Harry Zimmerman	do.	1973	H	S4S	H	Trg/sh
332	3948-7711	Oouglas Royston	---	1970	H	550	S	Trd/igc
333	394B-7711	Anthony Shriner	B & R Well Drilling, Inc.	197S	H	545	S	Trg/sh
334	3947-7711	Robert Gantz	Weldo W. Funt	1972	H	SOS	H	Trg/sh
33S	3947-7711	John Sanders	do.	1973	H	SOS	H	Trg/sh
336	394S-7711	Lyman Schwartz	John S. Funt	1973	H	S25	H	Trg/sh
337	3947-7712	James Nett, Jr.	Weldo W. Funt	1973	H	440	S	Trg/sh
338	3946-7714	Thomas Oolly	do.	197S	C	510	H	Trg/ss
339	3946-7714	do.	do.	1974	H	520	H	Trg/sh
341	3947-7709	R. W. Kelly	do.	1973	H	S82	H	Trg/sh
343	39SO-7712	Holiday Inn	Harrisburg's Kohl Bros.	1973	U	SOO	V	Trg/ss
344	39SO-7712	do.	do.	1973	U	SOO	V	Trg/ss
34S	3944-7712	Bernard Wiles	Cline & Ouvall, Inc.	1974	H	480	S	Trg/sh
346	3947-7722	Fairfield Munic. Auth.	A. C. Reider & Son, Inc.	1974	P	600	V	Trg/cgca
347	3947-7721	Carl Sturges	Weldo W. Funt	1974	H	59S	V	Trg/cgca
348	3947-7721	do.	do.	197S	H	595	V	Trg/cgca
349	3949-7719	KOA Campground	Austin R. Keyser, Inc.	1974	C	6SO	V	Trg/sh
3S0	3949-7711	Orummer Boy Campground	---	---	C	S6S	S	Trd/igc
3S1	3949-771S	T. F. Kotula, Jr.	Weldo W. Funt	1973	H	S3S	V	Trg/sh
3S2	39S1-7714	Oonald Bosserman	John S. Funt	1973	H	S9S	S	Trg/sh
3S3	39S1-7718	Tom Norman	do.	1973	H	602	H	Trg/sh
3S4	39S1-7720	Mrs. L. W. Sojka	do.	1973	H	S8S	V	Trg/sh
355	39S1-7721	Harold Recker	do.	1972	H	67S	S	Trg/sh
356	39S1-7721	L. E. Weaver	Weldo W. Funt	1974	U	675	H	Trg/sh
3S7	39SO-7722	Knouse Foods Inc.	Eichelberger Well Orilling, Inc.	1963	N	670	V	Trg/cgca
3S8	39SO-7721	do.	---	194S	N	63S	S	Trg/sh
359	3947-7721	Terry Hartle	Weldo W. Funt	1973	H	640	H	Trg/cgca
360	3947-7719	J. S. Krafft	William W. Reichart	197S	H	722	S	Trg/sh
361	39S3-772I	O. C. Kuhn	Weldo W. Funt	1972	H	820	S	Trg/cgs
362	39S3-772I	Reuben Kisner	John S. Funt	1972	H	780	S	Trg/cgs
363	39S3-7721	R. A. Fishel	Oenis H. Woodward	1971	H	780	5	Trg/cgs
364	3946-7723	U. S. Army	---	19S1	P	590	V	Trg/cgca
365	3946-7723	do.	---	19S1	P	6SO	V	Trg/cgca
366	3946-7723	do.	---	19S1	P	670	V	Trg/cgca
367	39S8-7704	Pa. Game Commission	Harrisburg's Kohl Bros.	1970	H	5S5	V	Trg/ss
368	39S8-7704	Bermudian Springs Sch.	Sprague & Henwood, Inc.	1960	T	620	H	Trg/sh
369	4001-7703	Robert Ouncan	Weldo W. Funt	1974	H	S9S	H	Trg/ss
370	4001-7703	John Adams	do.	1971	H	S70	S	Trg/ss
371	3955-7703	Oonald Kauffman	do.	1972	H	47S	V	Trg/sh
372	3955-7703	C. E. 5tockham	do.	1973	U	47S	V	Trg/ss
373	39SS-7703	Lealand Shearer	do.	1972	H	47S	V	Trg/sh
374	39SS-7707	P. H. Riley	do.	1973	H	S36	H	Trg/sh
37S	394S-7723	William McCleaf	do.	1973	H	630	U	mr/---
376	39S3-7706	Charles Williams	William W. Reichart	1974	H	S40	S	Trd/igc
377	3953-7706	Merl Mummert	do.	197S	H	570	S	Trd/igc
378	39S6-7703	Reading Twp.	Oenis H. Woodward	197S	H	SSS	V	Trd/igc
379	39S9-7713	Rice Fruit Co.	John S. Funt	1975	N	740	S	mr/---
380	3947-7723	Ray Alexander	do.	1974	H	730	S	mr/---
381	394S-7716	Timeless Towns	Oenis H. Woodward	1972	C	490	V	Trd/igc
382	394S-7716	do.	do.	1972	C	SOO	S	Trd/igc
383	394S-7716	do.	do.	1972	U	S20	S	Trd/igc
384	3945-7716	do.	Ralph E. Robison	1972	U	522	S	Trd/igc

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Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hardness (ppg)	Specific conductance (micromhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
140	---	6	---	---	---	2	---	11	510	---	Ad-305
240	40	6	30;175	100	5/73	8	.06	---	---	---	306
130	40	6	80;120	55	5/73	15	.20	13	500	---	307
97	27	6	40;80	5	6/73	6	.06	5	200	---	308
120	24	6	40;70;115	1	7/74	20	.18	17	650	---	309
172	30	6	45;168	8	7/76	25	.15	12	435	---	310
250	209	6	232	---	---	30	---	---	---	---	311
345	---	6	---	---	---	10	---	---	---	---	312
230	63	6	---	---	---	10	---	---	---	---	313
118	40	6	---	80	7/73	12	---	9	305	---	314
120	36	6	108	14	7/76	35	---	11	405	---	315
90	34	6	52;78	14	6/74	12	.18	11	450	---	316
100	17	6	92	F	8/73	30	.97	15	505	---	317
145	20	6	110	---	---	12	---	---	---	---	318
90	43	6	78	8	1/73	30	1.2	6	295	---	319
80	21	6	45	---	---	6	---	---	---	---	320
170	30	6	100;160	---	---	6	---	---	410	---	321
163	10	6	45;92;154	35	---	8	---	---	---	---	322
63	50	6	53	9	7/76	12	.75	7	280	---	323
92	78	6	80	18	6/73	10	.18	9	420	---	324
105	20	6	92	23	6/73	4	.06	12	470	---	325
80	20	6	42;68	21	10/72	20	.95	11	380	---	326
280	22	6	98;190;270	30	5/75	6	---	---	---	---	327
91	21	6	68	20	4/75	10	.21	---	---	---	328
60	21	6	55	6	11/73	4	.08	---	---	---	329
122	42	6	60;110	---	---	4	---	8	350	---	330
110	24	6	70;102	18	7/73	10	.17	14	450	---	331
182	26	6	120	65	1/70	3	---	5	230	---	332
98	38	6	45	40	7/75	1	.01	---	---	---	333
190	20	6	125;180	75	10/72	5	.05	---	---	---	334
112	21	6	42;102	30	4/73	10	.24	---	---	---	335
220	24	6	210	16	7/76	12	---	9	355	---	336
120	21	6	70;110	22	9/73	10	.19	12	450	---	337
300	37	6	92;192;258	34	4/75	20	.11	12	400	---	338
166	37	6	92;156	34	5/74	20	.23	---	---	---	339
100	24	6	62;94	20	8/73	10	.16	12	430	---	341
420	57	8	100;200;260; 320	10	8/76	295	1.1	6	---	7.8	343
220	80	8	100;150;190	12	8/76	22	.12	11	---	7.6	344
220	24	6	85;110;210	19	8/76	40	.22	9	350	---	345
57	12	8	38;53	7	11/74	112	6.6	9	350	6.6	346
48	37	8	42	12	12/74	18	.9	---	---	---	347
48	42	6	40	14	3/75	15	1.1	10	315	---	348
220	24	6	85;110;160	48	8/74	20	---	8	300	---	349
90	---	6	---	6	9/70	8	.12	10	380	---	350
124	24	6	52;114	10	7/73	8	.2	---	490	---	351
120	24	6	100	---	---	12	---	---	---	---	352
115	45	6	105	---	---	12	---	9	280	---	353
120	23	6	75;120	---	---	7	---	10	340	---	354
35	17	6	25	---	---	20	---	14	480	6.8	355
36	27	6	32	10	12/74	12	.67	---	---	---	356
100	60	8	---	26	8/76	300	15	7	295	---	357
242	---	6	---	10	8/76	100	---	20	750	---	358
68	29	6	60	16	8/73	12	.30	---	820	---	359
100	22	6	---	20	6/75	10	---	14	530	---	360
200	56	6	148	55	8/76	3	.02	3	110	---	361
60	50	6	56	---	---	10	---	1	50	---	362
100	---	6	85	35	6/71	25	---	---	---	---	363
225	202	10	211	20	6/51	230	5.8	5	---	7.5	364
133	---	10	---	68	---	220	---	5	---	7.7	365
300	---	10	---	74	---	230	---	---	---	---	366
250	34	6	196;250	20	3/70	20	.15	9	380	7.3	367
220	---	---	---	20	8/76	---	---	15	590	---	368
70	22	6	52;66	18	6/74	---	---	12	470	6.9	369
100	20	6	62;90	22	1/73	12	.19	---	---	---	370
140	23	6	118;132	30	8/72	10	.17	8	---	---	371
212	30	6	146;164	50	8/76	18	.16	---	---	---	372
125	23	6	116	32	8/72	7	.09	---	---	---	373
180	21	6	92;170	30	6/73	12	.1	10	340	---	374
120	18	6	110	12	7/73	3	.03	---	---	---	375
180	23	6	55;118;170	50	---	---	---	9	420	---	376
260	34	6	34;210	10	7/75	3	---	9	320	6.4	377
250	20	6	125	14	8/76	8	---	13	500	---	378
200	66	6	20;150	---	---	40	---	---	---	---	379
71	42	6	62	22	7/74	12	.29	---	---	---	380
300	---	6	---	---	---	8	---	---	---	---	381
300	---	6	---	---	---	18	---	---	---	---	382
300	21	6	---	---	---	0	---	---	---	---	383
200	31	6	---	14	7/76	4	---	---	---	---	384

TABLE 8.

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer/lithology
Number	Lat-Long							
Ad-385	3945-7716	Timeless Towns	Ralph E. Robison	1972	C	520	S	Trd/igc
386	3946-7716	do.	do.	1972	U	525	S	Trd/igc
387	3946-7716	do.	do.	1972	U	525	S	Trd/igc
388	3946-7716	do.	do.	1972	C	525	S	Trd/igc
389	3945-7715	do.	do.	1972	C	485	V	Trd/igc
390	3945-7715	do.	do.	1972	C	495	V	Trd/igc
391	3945-7715	do.	do.	1973	U	490	V	Trd/igc
392	3945-7716	do.	do.	1973	C	480	V	Trd/igc
393	3944-7704	8. F. Schriver Canning Co.	---	---	U	600	S	OCc/ls
394	3955-7715	8iglerville Water Co.	Eichelberger Well Orilling, Inc.	1977	P	640	V	Trg/sh
395	3948-7710	Lake Heritage Utilities, Inc.	Moody Orilling Co., Inc.	1965	U	530	V	Trg/sh
400	3959-7713	S. K. Group	Frank Wilson Jr.	1978	H	720	V	mr/---
401	3959-7713	G. Wright	do.	1978	H	700	S	mr/---
402	3959-7716	R. 8lack	do.	1978	H	820	T	mr/---
403	4002-7707	Thomas Harbold	Eichelberger Well Orilling, Inc.	1975	H	730	S	mr/---
404	4001-7711	Kenneth Toner	Frank Wilson Jr.	1973	H	930	W	mb/---
405	4000-7712	G. Motter	Eichelberger Well Drilling, Inc.	1979	H	920	S	mr/---
406	3959-7714	Oixie Showers	Frank Wilson Jr.	1977	H	820	S	mb/---
407	4000-7715	Clair Fetters	do.	1977	H	825	W	mb/---
408	3959-7714	E. W. Kegel	do.	1978	H	740	S	mr/---
409	3957-7718	R. G. Taylor	do.	1977	H	885	S	mr/---
410	3959-7718	P. Pitzer	do.	1978	H	1040	S	mr/---
411	3957-7721	William Kane	do.	1976	H	985	S	mr/---
412	4001-7709	J. B. Peters	Eichelberger Well Orilling, Inc.	1976	H	1010	S	mb/---
413	4001-7712	Richard Snyder	Frank Wilson Jr.	1977	H	865	S	mr/---
414	3959-7715	Herbert Wilson	---	1976	H	740	S	mb/---
415	3959-7718	H. Arndt	Frank Wilson Jr.	1978	H	1020	S	mr/---
416	3958-7718	P. Taylor	do.	1978	H	1100	S	vs/---
417	3957-7720	8iesecker Plumbing and Heating	Eichelberger Well Orilling, Inc.	1977	H	935	S	mr/---
418	3958-7721	R. Lott, Jr.	do.	1978	H	1205	S	mb/---
419	3958-7720	R. Lott	do.	1977	H	1180	S	mr/---
420	3954-7725	R. Heffner	Frank Wilson Jr.	1978	H	1340	S	mr/---
421	3955-7724	J. Scott	do.	---	H	1240	S	mr/---
422	3952-7722	J. Bream	do.	1978	H	900	S	mr/---
423	3947-7727	R. E. 8urrall	Eichelberger Well Orilling, Inc.	1976	H	1250	S	mb/---
424	3946-7724	John Bigham	Oavid Woodward	1979	H	735	V	Ch/---
425	3949-7723	J. R. Ziegler	Eichelberger Well Orilling, Inc.	1977	H	1190	H	mr/---
426	3950-7723	J. Stallsmith	Frank Wilson Jr.	1978	H	1030	S	mr/---
427	3951-7723	J. Gourley	do.	1978	H	1160	S	mr/---
428	3958-7715	R. Kime	do.	1978	H	850	H	mr/---
429	3954-7724	Cyrus Karper	do.	1977	H	1320	S	mr/---
430	4000-7716	Marlin Showers	do.	1977	H	1025	S	mr/---
431	4000-7716	Aldaus Gochenaur	do.	1977	H	855	W	mr/---
432	3957-7722	Rodger Parr	do.	1975	H	1330	H	mb/---
433	4003-7707	K. R. Robbins, Jr.	Eichelberger Well Orilling, Inc.	1977	H	690	S	mr/---
434	3951-7659	Abbottstown Bor.	---	---	P	755	S	Trn/---
436	3951-7703	New Oxford 8or.	---	1976	P	485	V	Trn/---
437	3956-7704	R. 8rooks	Eichelberger Well Orilling, Inc.	1978	H	575	V	Trd/igc
438	3956-7706	W. 8lanchard	do.	1979	H	575	V	Trd/igc
439	3954-7658	Robert Weigle	do.	1977	H	525	V	Trn/sh
440	3957-7709	R. 8uffington	John Thran	1979	H	630	S	Trd/igc
441	3957-7709	H. Fox	do.	---	H	630	S	Trd/igc
442	3952-7712	J. S. Hill	Eichelberger Well Orilling, Inc.	1977	H	522	V	Trg/sh
443	3943-7712	Thomas Little	Oavid Woodward	1978	H	462	V	Trg/sh
444	3944-7719	G. Glenn, Sr.	do.	1978	H	560	S	Trg/sh
445	3947-7718	J. Bigham, Sr.	do.	1979	S	530	V	Trg/sh
446	4000-7713	Musselmans Gardners Plant, Well 5	---	---	N	1005	S	mr/igc
447	4000-7713	Musselmans Gardners Plant, Well 6	---	---	N	915	S	mr/igc
448	4000-7712	Musselmans Gardners Plant, Well 7	---	---	N	810	S	mr/igc
449	4000-7713	Musselmans Gardners Plant, Well 8	---	---	N	1055	S	mr/igc
450	3958-7713	Ouffy-Mott Co., Inc.	Eichelberger Well Orilling, Inc.	1979	N	595	F	Trg/sh
451	3949-7701	Bethlehem Steel Corp., Hanover quarry	---	1961	N	520	F	Ck/sh
452	3949-7701	do.	---	1961	N	520	F	Ck/sh
453	3956-7704	E. L. Kapp	Denis H. Woodward	1977	H	575	S	Trd/igc

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Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hardness (gpg)	Specific conductance (micromhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
100	20	6	---	---	---	20	---	---	---	---	Ad-385
120	---	6	---	---	---	0	---	---	---	---	386
100	---	6	---	---	---	0	---	---	---	---	387
135	22	6	---	---	---	7	---	---	---	---	388
240	---	6	---	---	---	8	---	7	250	---	389
105	---	6	---	----	---	20	---	---	---	---	390
122	---	6	---	8	7/76	8	---	---	---	---	391
---	---	6	---	---	---	20	---	---	---	---	392
423	85	8	---	20	9/76	145	3.1	---	---	---	393
400	77	8	118;175;250; 352	10	10/77	150	0.73	12	475	---	394
499	39	6	---	21	7/65	30	.12	---	---	---	395
275	20	6	24;110	7	4/78	3	---	7	376	---	400
115	48	6	10;80	6	10/79	9	---	3	147	---	401
215	53	6	100	25	10/79	2	---	4	139	---	402
82	44	6	48;59;69	---	---	20	---	4	174	---	403
62	4	6	---	---	---	10	---	5	206	---	404
100	40	6	71;90	17	10/79	15	---	1	206	---	405
160	38	6	---	52	10/79	4	---	5	188	---	406
130	39	7	---	16	9/77	20	---	6	225	---	407
115	60	6	35;78	---	3/78	9	---	5	188	---	408
125	54	7	---	---	---	6	---	3	129	---	409
115	49	6	90	---	9/78	45	---	3	121	---	410
220	40	7	---	---	---	20	---	2	78	---	411
550	42	6	---	54	10/79	3	---	---	---	---	412
345	56	7	---	35	7/77	3	---	4	169	---	413
110	---	7	---	---	11/76	4	---	---	---	---	414
255	32	6	190	70	10/79	3	---	3	162	---	415
145	28	6	132	---	---	9	---	2	130	---	416
250	23	6	---	---	---	3	---	---	---	---	417
175	40	6	108	44	10/79	1	---	8	312	---	418
400	42	6	174;286;370	---	---	4	---	---	---	---	419
310	40	6	---	43	10/79	2	---	2	70	---	420
275	20	---	---	46	10/79	4	---	2	104	---	421
400	40	6	397	21	10/79	12	---	---	---	---	422
72	40	6	---	---	---	50	---	2	80	---	423
80	20	6	64	---	4/79	16	---	---	---	---	424
75	43	6	50	---	---	25	---	---	---	---	425
130	43	6	86	40	10/79	9	---	---	---	---	426
250	60	6	---	---	5/78	1	---	---	---	---	427
315	24	6	---	---	8/78	1	---	---	---	---	428
55	47	7	---	6	9/77	60	---	---	---	---	429
275	40	7	---	---	---	7	---	---	---	---	430
165	39	7	---	16	8/77	12	---	---	---	---	431
122	35	6	84;96	59	6/75	6	---	---	---	---	432
210	42	6	---	18	10/79	20	---	4	169	---	433
---	---	---	---	---	---	8	---	---	---	---	434
300	65	6	90;180	40	8/76	35	---	---	---	---	436
150	50	6	61;67;119; 136	---	10/78	10	---	---	---	---	437
75	35	6	43	3	5/80	10	---	7	232	---	438
175	72	6	163	22	5/80	7	---	7	190	---	439
100	20	6	90	---	8/79	30	---	---	---	---	440
80	20	6	76	---	8/79	100	---	---	---	---	441
175	42	6	108;168	---	8/77	8	---	12	393	---	442
157	22	6	132	32	5/80	7	.06	11	440	---	443
112	20	6	67;96	1	5/80	12	.13	---	---	---	444
195	24	6	112;147;190	38	5/80	60	1.5	13	600	---	445
150	38	6	---	---	---	18	---	---	---	---	446
215	36	6	---	---	---	20	---	---	---	---	447
160	65	6	---	---	---	18	---	---	---	---	448
171	50	6	---	---	---	35	---	---	---	---	449
400	45	6	23;41;51;72	13	9/79	200	2.3	---	---	---	450
400	---	---	---	90	1/61	---	---	---	---	---	451
395	395	6	---	60	7/61	---	---	---	---	---	452
103	15	6	18;21;55	5	5/80	25	---	9	227	---	453

TABLE

Well location		Owner	Driller	Date completed	Use	Altitude of land surface (feet)	Topographic setting	Aquifer lithology
Number	Lat-Long							
Ad-454	3956-7705	Hershey 8owers	Eichelberger Well Drilling, Inc.	1976	H	575	5	Trd/---
455	3957-7706	M. 8levins	do.	1978	H	575	V	Trg/sh
456	3956-7706	M. Wolfe	Frank Wilson Jr.	1979	H	620	5	Trd/igc
457	3958-7711	Ed Staley	do.	1979	H	760	5	Trg/cgq
458	3958-7710	J. J. 5laybaugh	---	1980	H	700	5	Trg/sh
459	3958-7715	C. Cooley	Frank Wilson Jr.	1978	H	800	S	mr/igc
460	4000-7714	R. Crum	do.	1979	H	1080	5	mr/igc
461	3948-7708	8onneauville 8or.	Harrisburg's Kohl 8ros.	1977	U	590	5	Trn/---
462	3948-7708	J. A. Chrismer	John 5. Funt	1973	H	555	W	Trg/---
463	3957-7717	Robert Lott	Eichelberger Well Drilling, Inc.	1974	H	975	5	mr/igc
464	3947-7713	Clarence Andrew	do.	1976	H	525	F	Trd/igc
465	3946-7712	M. Emmons	do.	1979	H	460	F	Trg/sh
466	3947-7713	R. Martin	David Woodward	1979	H	485	F	Trg/---
467	3946-7714	W. Kauffman	do.	1979	H	480	F	Trd/igc
468	3950-7712	W. Heflin	Eichelberger Well Drilling, Inc.	1978	H	520	F	Trg/sh
469	3950-7712	L. Light	do.	1978	H	485	F	Trg/sh
470	3951-7712	Gettysburg Transformer Corp.	do.	1979	N	545	F	Trg/sh
471	3952-7713	Dave Redding	David Woodward	1980	C	510	V	Trg/sh
472	3951-7708	William 8enson	do.	1979	H	610	F	Trd/igc
473	3945-7713	Lester Light	do.	1979	H	420	F	Trg/sh
474	3945-7713	Kenneth Miller	do.	1980	H	460	F	Trg/sh
475	3945-7711	Rodney Wolf	do.	1978	H	518	F	Trg/sh
476	3945-7713	Harry Anders	do.	1978	H	430	F	Trg/sh
477	3947-7713	H. Cassler	Eichelberger Well Drilling, Inc.	1978	H	520	F	Trd/igc
478	3950-7712	Raymond McCoy	David Woodward	1979	H	580	5	Trg/sh
479	3949-7711	R. 8oyer	do.	1978	H	540	F	Trd/igc
480	3953-7712	D. Mentzer	Eichelberger Well Drilling, Inc.	1979	H	580	5	Trg/sh
481	3956-7712	C. Whitmoyer	do.	1978	H	595	F	Trg/sh
482	3957-7707	F. McCauslin	do.	1978	H	620	S	Trg/sh
483	3957-7708	I. 5mith, 5r.	do.	1979	H	560	V	Trd/igc
484	3958-7709	E. Yentzer	do.	1978	H	630	S	Trd/igc
485	3958-7709	Jack Heebner	do.	1976	H	720	H	Trd/igc
486	3939-7709	R. Miller	do.	1978	H	740	V	Trd/igc
487	3958-7707	D. 5ibert	do.	1978	H	620	S	Trg/sh
488	3957-7710	M. 8ucher	do.	---	H	780	5	Trd/igc
489	3944-7706	R. 8eatty	do.	1978	H	595	F	Trn/cgq
490	3951-7659	W. 8ecker	do.	1978	H	909	H	Cch/cgq
491	3949-7716	Donald Martin	Eichelberger Well Drilling, Inc.	1977	H	523	V	Trg/sh
492	3749-7716	D. Martin	do.	1978	H	518	V	Trg/sh
493	3948-7717	J. 5nyder	do.	1979	H	470	5	Trg/sh
494	3948-7718	Richard Lawver	David Woodward	1978	H	557	5	Trg/sh
495	3947-7718	D. Mason	do.	1979	H	540	5	Trg/sh
496	3947-7719	R. 5entz	Eichelberger Well Drilling, Inc.	1979	H	720	F	Trd/igc
497	3949-7719	R. 8ushman	do.	1979	H	539	F	Trd/igc
498	3950-7721	I. Musselman	do.	1978	H	658	S	Trd/igc
499	3950-7721	H. Y. Musselman	do.	1977	H	663	V	Trd/igc
500	3948-7719	Lower Marsh Creek Presbyterian Ch.	David Woodward	1978	T	570	5	Trg/sh
501	3948-7720	8ently 5harrah	do.	1978	H	615	S	Trg/sh
502	3948-7720	Arthur Miller	do.	1979	H	910	V	Trg/sh
503	3948-7720	Richard Trostel	do.	1978	H	655	S	Trd/igc
504	3948-7720	do.	do.	1978	H	670	5	Trd/igc
505	3948-7720	Thomas 5tahl	Eichelberger Well Drilling, Inc.	1976	H	600	5	Trd/igc
506	3947-7721	Martin Hardman	David Woodward	1979	H	630	S	Trg/cgc
507	3947-7720	8ob Kreitz	do.	1979	H	615	S	Trd/igc
508	3947-7721	Hamiltonban Twp. Maintenance 8ldg.	do.	1979	H	620	5	Trg/cgc
509	3950-7717	8ottorf Home 5ales	Eichelberger Well Drilling, Inc.	1980	H	590	5	Trg/sh
510	3950-7718	R. Hay	do.	1979	H	601	F	Trg/sh
511	3952-7721	H. Miller	do.	1979	H	590	F	Trg/sh
512	3946-7721	E. Hensdale	David Woodward	1978	H	580	H	Trg/sh
513	3946-7721	T. Kane	do.	1978	H	781	H	Trg/sh
514	3946-7721	George 8rent	do.	1978	H	640	S	Trd/igc
515	3944-7716	Eric 5mith	do.	1979	H	551	5	Trd/igc
516	3944-7723	J. 8each	Eichelberger Well Drilling, Inc.	1978	H	730	5	mb/igf
517	3921-7725	P. Smith	David Woodward	1979	H	760	S	mb/igf
518	3946-7723	John Mullins	do.	1979	H	638	F	Trg/cgc
519	3947-7722	W. 5ites	do.	1979	H	619	V	Trg/cgc
520	3953-7720	Ed Hildebrand	do.	1979	H	690	S	Trd/igc
521	4001-7712	D. Mentzer	Eichelberger Well Drilling, Inc.	1979	H	1015	5	mr/igf

(CONTINUED)

Total depth below land surface (feet)	Casing		Depth(s) to water-bearing zone(s) (feet)	Static water level		Reported yield (gpm)	Specific capacity (gpm/ft)	Hardness (gpg)	Specific conductance (micromhos at 25°C)	pH	Well number
	Depth (feet)	Diameter (inches)		Depth below land surface (feet)	Date measured (mo/yr)						
100	30	6	52;95	---	11/76	8	---	23	633	---	Ad-454
75	42	6	66	3	5/80	15	---	49	1200	---	455
145	23	6	128	24	12/79	15	---	---	---	---	456
150	54	6	122	17	6/79	30	---	---	---	---	457
115	27	6	82;96;103	15	3/80	15	---	6	215	---	458
240	35	6	86	14	2/80	2	---	4	200	---	459
115	40	6	---	---	5/79	8	---	4	190	---	460
580	50	8	70	6	3/77	5	---	---	---	---	461
160	22	6	156	16	1/77	15	.15	---	---	---	462
175	21	6	---	---	6/74	15	---	---	---	---	463
125	49	6	73;97	---	8/76	8	---	5	250	---	464
200	56	6	184;191	---	7/79	20	---	---	---	---	465
217	21	6	97;196	18	5/79	25	.27	---	---	---	466
97	21	6	22;70	17	1/79	9	.12	---	---	---	467
250	41	6	163;195	---	10/78	6	---	---	---	---	468
275	41	6	206;259	---	10/78	8	---	---	---	---	469
275	42	6	256	43	6/80	12	---	6	240	---	470
172	23	6	149	F	3/80	12	.08	---	---	---	471
64	31	6	50	16	6/80	15	.83	14	320	---	472
292	17	6	60;280	52	6/80	6	.03	9	295	---	473
200	20	6	170	40	2/80	4	.03	---	---	---	474
82	40	6	62	18	8/78	7	.11	8	360	---	475
231	21	6	80;212	52	10/78	30	.41	---	---	---	476
300	---	6	299	79	6/80	4	---	13	510	---	477
350	20	6	112	58	9/79	2	.01	---	---	---	478
97	20	6	35	9	6/80	8	.09	8	260	---	479
100	42	6	60;79	24	6/80	12	---	---	---	---	480
150	42	6	123;135	---	11/78	15	---	---	---	---	481
125	42	6	117	F	6/80	20	---	---	---	---	482
200	25	6	100;254	---	1/79	1	---	5	220	---	483
75	32	6	64	2	6/80	30	---	---	---	---	484
255	60	5	218;253	---	9/76	4	---	---	---	---	485
200	42	6	165;286	---	9/78	3	---	---	---	---	486
250	40	6	148;165;245	---	10/78	50	---	12	440	---	487
200	40	6	---	31	6/80	1	---	---	---	---	488
125	88	6	103	17	6/80	15	---	4	118	---	489
350	40	6	340	---	4/78	4	---	---	---	---	490
125	106	6	117	31	6/80	15	---	15	610	---	491
125	42	6	87;115	---	7/78	12	---	---	---	---	492
225	40	6	204;220	66	6/80	50	---	---	---	---	493
162	21	6	152	12	6/80	50	2.5	---	---	---	494
157	21	6	112;137	33	6/80	30	.43	11	460	---	495
425	42	6	300;304;379	44	6/80	4	---	---	---	---	496
125	23	6	53	18	12/79	3	---	---	---	---	497
200	42	6	226	5	6/80	1	---	---	---	---	498
100	86	6	92	17	6/80	12	---	9	375	---	499
110	21	6	50	17	6/80	8	.11	10	450	---	500
80	21	6	51	7	10/78	8	.11	15	480	---	501
80	17	6	67	5	8/79	22	.4	9	340	---	502
275	7	6	130	5	10/78	1	---	---	---	---	503
112	11	6	13;20;45	12	12/78	2	.02	---	---	---	504
230	21	6	226	6	6/80	15	---	7	480	---	505
125	21	6	27;110	24	7/79	15	.19	---	---	---	506
97	39	6	82	27	7/79	12	.23	---	---	---	507
112	21	6	92	12	3/79	16	.44	---	---	---	508
250	42	6	191;234	73	3/80	7	---	---	---	---	509
175	41	6	125;134;164	30	6/80	20	---	---	---	---	510
175	42	6	60;164	---	9/79	9	--	---	---	---	511
200	21	6	178	61	6/80	4	.03	18	812	---	512
277	20	6	127;220	31	9/78	3	.01	---	---	---	513
276	21	6	80;160	39	6/80	1	.01	5	205	---	514
247	20	6	112;240	26	6/80	5	.03	9	320	---	515
550	42	6	400;485	---	9/78	3	---	---	---	---	516
142	44	6	120	15	6/80	15	.23	5	175	---	517
82	43	6	67	31	6/80	15	.6	7	225	---	518
50	26	6	37	8	5/79	16	.5	---	---	---	519
200	32	6	105	25	6/79	2	.01	---	---	---	520
175	63	6	122;143;158	---	11/79	12	---	---	---	---	521

TABLE 8

Well location		Owner	Oriller	Oate completed	Use	Alti-tude of land surface (feet)	Topo-graphic setting	Aquifer/ lithology
Number	Lat-Long							
Ad-522	4000-7711	G. Kime	Eichelberger Well Drilling, Inc.	1979	H	775	S	Trg/---
523	4000-7711	do.	do.	1979	S	785	S	Trg/---
524	4002-7708	S. Helman	do.	1980	H	705	S	mr/igf
525	4003-7708	R. Weaver	do.	1980	H	785	S	mr/igf
526	4003-7707	James Shaffer	do.	1977	H	750	V	mr/igf
527	4000-7710	F. Kuntz	do.	1978	H	825	S	Trg/---
528	4000-7710	O. Kuntz	do.	1976	H	925	S	Trg/---
529	4002-7704	C. Miller	do.	1979	H	585	F	Trg/ss
530	4000-7705	Larry 8randt	do.	1977	H	550	S	Trg/sh
531	4000-7705	O. 8augher	do.	1979	H	560	S	Trg/sh
532	4000-7704	Paul 8randt	do.	1977	H	595	H	Trg/sh
533	4001-7707	Sunnyside Cemetery Assoc.	do.	1978	H	695	S	Trg/---
534	4002-7707	E. Weiser	do.	1978	H	580	S	Trd/igc
535	4002-7707	E. Reynolds	do.	1976	H	690	H	Trg/---
536	4002-7706	R. Hill	do.	1978	H	585	F	Trg/---
537	4002-7706	E. Weiser	do.	1979	I	585	F	Trg/---
538	4002-7706	do.	do.	1979	H	565	S	Trg/ss
539	4003-7706	P. Yohn	do.	1979	H	620	S	Trg/---
540	4000-7705	Latimore Twp.	do.	1978	H	595	F	Trg/ss
541	4002-7705	Oavid Murtoff	do.	1976	H	580	F	Trg/ss
542	4000-7702	C. Oupert	do.	1978	H	475	F	Trg/sh
543	4000-7702	O. Oupert	do.	1979	H	475	F	Trg/sh
544	4000-7701	8. Anderson	do.	1978	H	468	F	Trg/sh
545	3959-7705	K. Hankey	do.	1978	H	525	S	Trg/sh
546	3958-7704	M. 8levins	do.	1978	H	565	F	Trg/sh
547	3958-7703	S. Sanderson	do.	1979	H	520	V	Trg/sh
548	3959-7702	Lower Bermudian Lutheran Ch.	do.	1979	T	505	F	Trd/igc
549	3958-7701	Jack Anderson	do.	1977	H	560	S	Trd/igc
550	3959-7702	G. Anderson	do.	1979	H	500	V	Trd/igc
551	3945-7722	Ski Liberty	Oavid Woodward	1978	H	620	S	Trg/sh
552	3945-7722	do.	do.	1979	P	580	V	Trg/sh
553	3945-7722	do.	do.	1978	P	580	V	Trg/sh
560	3959-7716	J. 8ernstein	Eichelberger Well Orilling, Inc.	1979	H	1030	S	mr/igf
561	3945-7715	O. Stewart	Oavid Woodward	1979	H	490	V	Trd/igc
562	3945-7715	Tom Reindoller	---	1979	H	545	H	Trd/igc
563	3950-7721	O. Kane	Oavid Woodward	1979	H	662	S	Trg/sh
564	3951-7716	Heritage Assembly of God Ch.	do.	1979	T	575	S	Trd/igc
565	3951-7704	L. Lesage	William W. Reichart	1979	H	540	S	Trn/sh
566	3950-7710	William Nace	Frank Wilson Jr.	1978	H	590	F	Trd/igc
567	3953-7702	H. Frock, Jr.	Eichelberger Well Orilling, Inc.	1979	H	570	F	Trn/ss

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)tal :pth :low :nd :face :et)	Casing Oepth (feet)	Casing Oiameter (inches)	Oepth(s) to water-bearing zone(s) (feet)	Static water level Oepth below land surface (feet)	Static water level Oate measured (mo/yr)	Reported yield (gpm)	Specific capacity (gpm/ft)	Hard-ness (gpg)	Specific conduc-tance (micro-mhos at 25°C)	pH	Well number
150	61	6	85;260;335	---	6/79	15	---	---	---	---	Ad-522
'74	190	6	558;610;768	44	6/80	30	---	---	---	---	523
:00	40	6	191	45	4/80	8	---	---	---	---	524
:00	43	6	60;337	22	6/80	2	---	1	155	---	525
.25	42	6	65;94	---	7/77	5	---	---	---	---	526
:75	42	6	190;255	---	7/78	4	---	4	190	---	527
:00	42	6	51;283	---	7/76	2	---	---	---	---	528
75	42	6	112	37	6/80	7	---	---	---	---	529
48	23	6	55;112	---	4/77	30	---	17	595	---	530
25	36	6	71;92;109	---	9/79	17	---	---	---	---	531
50	63	6	140	---	8/77	25	---	---	---	---	532
:25	74	6	96;192;214	---	12/78	9	---	---	---	---	533
00	25	6	---	---	8/78	1	---	---	---	---	534
.50	73	6	146	---	1976	8	---	---	---	---	535
.00	40	6	70;87	24	6/80	25	---	---	---	---	536
50	44	6	91;107;134	---	9/79	20	---	---	---	---	537
85	41	6	69;83	---	9/79	12	---	---	---	---	538
20	43	6	144	---	4/79	50	---	---	---	---	539
:75	41	6	118;193;246	---	12/78	4	---	---	---	---	540
:00	60	6	80;195	---	10/76	6	---	---	---	---	541
10	42	6	70;105	---	7/78	15	---	---	---	---	542
00	42	6	79	12	6/80	8	---	---	---	---	543
25	41	6	84;119	---	10/78	20	---	---	---	---	544
:25	42	6	88;135;234	---	11/78	4	---	---	---	---	545
00	42	6	273;287	---	8/78	12	---	---	---	---	546
75	41	6	142;155	6	6/80	12	---	10	500	---	547
50	---	---	· 550	---	10/79	.25	---	---	---	---	548
:25	62	6	73;171	---	5/77	10	---	---	---	---	549
00	30	6	532;583	---	5/79	3	---	---	---	---	550
72	21	6	60;152	32	12/78	10	.08	---	---	---	551
52	22	6	95;250;292	21	1/79	70	2.4	---	---	---	552
02	21	6	67;97	18	9/78	25	.30	---	---	---	553
00	56	6	300	---	7/79	1	---	---	---	---	560
82	21	6	24;67	14	2/79	15	.29	---	---	---	561
57	20	6	112;138	35	9/79	8	.08	---	---	---	562
82	74	6	50	16	6/80	10	.22	---	---	---	563
27	21	6	67;120	F	1/79	100	---	17	605	---	564
00	23	6	71	40	6/79	1	---	---	---	---	565
70	54	6	55	15	6/80	75	---	---	---	---	566
75	42	6	130;268	---	1/79	7	---	---	---	---	567

Table 9. *Record of Springs*

Spring number	Location (latitude-longitude)	Owner (Spring name)	Altitude above sea level (feet)	Aquifer	Discharge (gal/min)	Date measured or estimated	Estimated median discharge characteristics (gal/min)	Use	Temperature (°C)	Remarks
Ad-1	394321-770629	Charles Koontz	540	New Oxford Formation	<10 (E)	8-08-60	—	H	13	
Ad-2	395944-770540	(York Sulphur Spring)	515	Gettysburg Formation	2 (E)	10-31-25	3	U	10	Hydrogen sulfide gas.
Ad-3	395305-772155	Commonwealth of Pennsylvania	820	Weverton Formation	2 (E)	10-30-25	3	U	11	
Ad-4	395125-772401	(Poplar Spring)	1120	Metarhyolite	5 (E)	10-27-25	6	U	11	
Ad-5	395521-772750	(Stillhouse Spring)	975	Weverton Formation	—	—	—	—	10	
Ad-6	395155-770055	David O'Brien	590	New Oxford Formation	—	—	—	S	15	
Ad-7	395636-765929	James Muller	408	New Oxford Formation	—	—	—	H	15	
Ad-8	395946-771407	Aspers Water Company	870	Metarhyolite	—	—	—	—	—	

E = estimated.

Table 10. *Chemical Analyses of Groundwater*

(Results are in milligrams per liter unless otherwise indicated)

Well number	Date of collection	Aquifer[1]	Data source[2]	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (N)	Phosphate (PO_4)	Dissolved solids	Total hardness (as $CaCO_3$)	pH (units)	Specific conductance (micromhos)
4	11/ 3/60	Trn	U	22	1.2	0.03	102	55	26	1.2	212	120	104	0.0	27	—	—	481	7.6	1040
8	11/ 3/60	Trn	U	25	.04	0	42	13	9.1	.8	156	20	11	.1	3.3	—	—	159	7.2	329
23	11/ 3/60	Trn	U	15	.06	.02	22	7.8	7.4	1.4	42	30	11	.1	8	—	—	87	6.4	235
54	10/31/60	Trn	U	18	.78	.09	82	33	34	5.0	180	76	72	.3	22	—	—	340	6.7	806
62	2/28/61	Trg	U	22	.03	.04	66	22	15	1.0	246	45	16	.0	1	—	337	260	7.2	535
69	11/ 3/60	Trn	U	20	.19	.05	69	44	26	32	232	104	78	.0	8.4	—	—	353	7.0	857
72	5/12/49	Trn	C	—	.6	—	—	—	—	—	—	—	1	—	0	—	130	112	7.6	—
83	9/18/50	Trn	C	—	.1	—	—	—	—	—	—	—	37	—	6.0	—	435	184	7.3	—
84	11/ 3/60	Trn	U	21	.03	.01	41	12	20	1.1	174	23	22	.2	4	—	—	161	7.5	344
92	11/ 1/25	Trn	U	16	.14	—	47	11	—	—	105	73	22	—	6	—	—	163	—	—
101	10/31/60	Trn	U	20	2.4	.03	30	7.4	10	1.0	142	2.5	2.0	.0	1.5	—	—	106	7.7	233
135	11/ 1/25	Trn	U	18	.03	.03	52	12	17	1.0	198	27	13	.0	.4	—	—	179	7.1	411
136	11/23/60	Trg	U	16	.14	.02	56	13	42	2.5	211	55	18	.3	10	—	353	210	7.4	553
137	10/31/60	Trg	U	18	.04	.02	64	16	18	.8	216	41	14	.0	5.4	—	300	279	7.4	478
146	5/15/68	Trg	U	22	.78	0	37	12	8.0	1.1	134	24	4.0	.0	3.8	—	204	172	8.2	360
153	10/18/41	Trg	C	—	.3	—	—	—	—	—	—	—	1	—	1.7	—	50	24	6.0	—
154	7/15/57	Trg	C	—	.1	—	—	—	—	—	—	—	3	0	2.2	—	100	64	6.2	—
155	5/12/48	Trg	C	—	.0	—	—	—	—	—	—	—	2	—	1.5	—	110	74	7.0	—
156	9/ 5/56	Trg	C	—	.0	—	—	—	—	—	—	—	6	0	2.6	—	95	92	6.7	—
157	7/16/64	Trg	C	—	.0	—	—	—	—	—	—	—	5	0	3.0	—	105	68	6.7	—
164	11/18/76	Trg	U	19	—	0	22	7.0	3.3	1.3	91	2.9	2.1	.1	1.5	.03[a]	107	93	6.5	175
165	7/ 6/51	Trg	C	—	.1	—	—	—	—	—	—	—	4	—	1	—	240	176	7.4	—
166	9/16/60	Trg	C	—	.3	—	—	—	—	—	—	—	3	—	2.0	—	175	120	7.7	—
174	11/30/66	Trg	C	—	0	—	—	—	—	—	—	—	6	—	5.0	—	256	124	6.7	—
182	5/20/69	Ca	U	14	.55	.07	24	9.0	4.2	2.0	88	25	6.9	.0	.8	—	—	97	—	205
185	5/13/69	Ck	U	7.1	.03	0	100	42	44	2.0	394	13	122	.0	4.4	—	—	422	7.2	1000
189	5/15/69	Ck	U	11	.04	.01	52	17	21	1.1	211	31	32	.0	2.7	—	—	200	—	510
199	5/29/69	OCc	U	8.9	1.6	.08	38	9.4	3.8	1.8	124	8.1	9.0	.1	8.9	—	—	134	—	425
212	8/29/69	Ch	U	7.8	.25	0	8.6	4.8	12	1.2	18	3.9	26	.2	2.7	—	—	41	6.3	160
224	9/18/69	Xwm	U	8.1	.28	.10	3.6	3.2	1.3	.2	34	1.1	1.6	.2	.02	—	—	22	5.8	55

Table 10. *(Continued)*

Well number	Date of collection	Aquifer[1]	Data source[2]	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (N)	Phosphate (PO_4)	Dissolved solids	Total hardness (as $CaCO_3$)	pH (units)	Specific conductance (micromhos)
241	10/30/25	Trg	U	24	.08	—	73	19	—	—	190	82	27	—	2.2	—	377	370	—	—
244	10/30/25	Trg	U	16	.14	—	76	27	—	—	277	25	57	—	.27	—	371	374	—	—
250	10/29/25	Trd	U	36	.17	—	53	27	—	—	155	59	13	—	11	—	333	360	—	—
252	6/17/76	Trg	C	—	.07	.02	40	21	—	—	—	—	12	.1	.61	—	328	254	7.8	—
258	4/16/64	mr	C	—	0	—	—	—	—	—	—	—	1	1.2	1.1	—	152	86	7.3	—
259	7/6/66	mr	C	—	.2	—	—	—	—	—	—	—	0	—	0	—	98	46	6.8	—
260	6/6/63	mr	C	—	0	—	—	—	—	—	—	—	0	—	.4	—	38	14	6.8	—
261	11/10/65	Trg	C	—	0	—	—	—	—	—	—	—	4	0	4.0	—	280	148	7.8	—
262	11/12/65	Trg	C	—	0	—	—	—	—	—	—	—	3	0	2.6	—	235	160	7.4	—
265	9/29/67	Trg	C	—	0	—	—	—	—	—	—	—	3	0	2.0	—	—	130	6.8	—
266	8/ 3/77	Trn	C	—	0	.1	51	13	—	—	—	6.4	24	.13	.11	—	336	182	7.8	—
268	2/26/74	Trn	C	—	.05	0	50	88	—	—	—	4.0	5	0	.02	—	201	161	7.9	—
270	2/25/70	Trg	C	—	0	0	—	—	—	—	—	87	2.7	0	0	—	296	208	7.6	—
346	11/17/76	Trg	U	—	.10	.03	57	4.3	7.6	2.4	162	14	9.9	.1	2.7	.01[a]	198	187	6.6	330
355	11/17/76	Trg	U	14	.08	0	64	19	7.1	1.0	252	28	7.1	.1	3.1	.02[a]	270	272	6.8	450
367	11/18/76	Trg	U	26	.11	0	45	12	14	3.8	188	22	7.5	.1	4.0	.03[a]	237	168	7.3	370
369	11/18/76	Trg	U	20	.02	0	60	15	20	.7	273	25	6.2	.2	1.0	.01	273	210	6.9	458
377	11/17/76	Trd	U	51	.09	.02	30	18	4.5	.4	128	44	4.4	.1	1.1	.01	215	194	6.4	300
394	10/27/77	Trg	C	—	<.05	<.02	149	17.8	—	—	—	34	.3	.66	4	—	330	240	7.5	—
436	9/8/77	Trn	C	—	.12	.05	—	—	—	—	—	38	—	.12	8.4	—	310	153	7.4	—
450	9/25/79	Trg	—	—	.12	0	45.8	14	—	—	116	—	7.2	.14	.59	—	278	163	7.4	—
Sp-1	11/3/60	Trn	U	10	.04	.03	5.7	4.9	4.0	1.5	14	.8	5.2	.0	6.2	—	—	57	5.7	93
Sp-2	10/31/25	Trg	U	22	.07	—	209	8.3	—	—	148	581	41	—	—	—	1106	560	—	—
Sp-9	4/13/78	mr	U	—	.01	0	7.4	2.7	—	—	25.4	8.0	2.2	.06	1.6	—	—	30	6.0	—

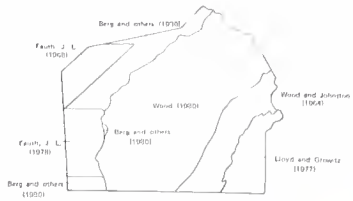
[1] Trd, diabase; Trg, Gettysburg Formation; Trn, New Oxford Formation; OCc, Conestoga Formation; Ck, Kinzers Formation; Ca, Antietam Formation; Ch, Harpers Formation; Xwm, Marburg Schist; mr, metarhyolite.
[2] C, commercial; U, U. S. Geological Survey.

EXPLANATION

UNIT	GEOLOGIC DESCRIPTION	WATER-BEARING PROPERTIES	QUALITY OF WATER*
DIABASE Jd	Medium- to coarse-grained, dark-gray rock composed mainly of plagioclase feldspar, pyroxene, and accessory magnetite; massive; dark gray on fresh surface but weathers gray or light-buff; main body is large sheet that crosses the county from southwest to northeast, having an approximate thickness of 1,800 feet; several large, cross-cutting bodies branch at right angles to the northern side of the main body; the largest is in Middle Creek valley; also, numerous dikes and a small lava flow occur throughout the areas of intruded rocks; generally forms low to prominent ridges	Reported yields range from less than 1 to 100 gal/min; the median for domestic and non-domestic wells is 8 gal/min. Median specific capacities are 0.14 (gal/min)/ft and 0.06 (gal/min)/ft for domestic and nondomestic wells, respectively	Water is generally hard; median hardness is 151 mg/L; quality is commonly poor because of the shallow circulation system in the aquifer (Wood, 1968b); concentrations of iron, sulfate, and nitrate have been found to exceed recommended limits in some wells
TRIASSIC — **GETTYSBURG FORMATION** Rgsc, Rgslc, Rgss, Rgsh	Primarily poorly bedded red shale, 1 to 3 mi wide, containing interbeds of medium- to fine-grained red sandstone (Rgss), shale is altered to dark-red purple by fine-grained, fragile argillite near contact with intrusive diabase; coarse quartz conglomerate (Rgsc), 1 to 3 mi wide, is a matrix of red sand, and limestone conglomerate (Rgslc), 1 mi wide, is a red calcareous matrix; occur locally; also beds of light-colored sandstone, green and yellow shale, and black, carbonaceous shale are present in minor amounts; this knoss is approximately 16,000 feet; unit crosses the county from southwest to northeast in a belt about 12 miles wide	Reported yields range from 1 to 670 gal/min; the medians for domestic and nondomestic wells are 12 gal/min and 150 gal/min, respectively. Specific capacities range from 0.01 to 15 (gal/min)/ft; median for domestic wells is 0.18 (gal/min)/ft and median for nondomestic wells is 1.0 (gal/min)/ft	Water is generally hard; median hardness is 171 mg/L; 3 out of 26 samples analyzed had iron concentrations exceeding recommended limits; one sample each exceeded the limits for sulfate, nitrate, and dissolved solids; quality is predominantly good
NEW OXFORD FORMATION Rn	Red to purplish-red shale, sandstone, and mudstone having many interspersed beds of light-colored micaceous sandstone, arkose, and conglomerate; sandstone and arkose beds are most common in lower part of unit; coarse conglomerate (Rnc) consists chiefly of subangular to subrounded quartzose pebbles and boulders in a poorly sorted red sand matrix; and occurs at base of section along north side of Pigeon Hills; total thickness is about 9,000 feet; unit crops out in a belt about 4 miles wide northwest of the Mesozoic and Harrisburg lowland	Reported yields range from 1 to 100 gal/min, the medians for domestic and nondomestic wells are 6 gal/min and 30 gal/min, respectively. The range of six specific capacity measurements obtained for this formation is 0.04 to 1.0 (gal/min)/ft	Water is generally hard, median hardness is approximately 156 mg/L; over 25 percent of the samples analyzed do not meet recommended limits for iron and manganese; 2 out of 15 samples exceeded the limit for nitrates
ORDOVICIAN — **BEEKMANTOWN GROUP** Ob	Primarily exposed residual gray, locally laminated limestone with some white coarse-grained calcite veins; gray limestone in the lowland east of South Mountain and Hardrock Hills yields white or gray soils, some of which is coarse and residual and mixed with shale near York Springs; may include some younger rocks (Conococheague Fm.) of Cambrian age	No well data were obtained for this unit. A study in Franklin County found this unit to be one of the better aquifers in the county (Becher and Taylor, in preparation)	No data; water is probably very hard
CONESTOGA FORMATION Oco	Thickly bedded to very massive, dark-gray limestone having some light-gray to light-gray and red limestone partings; black to dark-gray shale and very impure limestone occur at least locally in the lowland around McSherrystown and is probably over 1,000 feet thick	Reported yields range from 5 to 350 gal/min; the medians for domestic and nondomestic wells are 26 gal/min and 28 gal/min, respectively. Specific capacities range from 0.05 to 2.6 gal/min/ft. The median for domestic wells is 1.1 (gal/min)/ft and the median for nondomestic wells is 2.6 (gal/min)/ft	Water is generally very hard; median hardness is 265 mg/L; both iron and manganese exceeded recommended limits in a sample from this unit
LEDGER FORMATION Cl	Poorly exposed, coarse-grained, gray dolomite with pure, white and light-gray marble; occupies most of the limestone area north of Edgegrove and west of Bittinger. Thickness cannot be accurately determined but is estimated to be about 2,000 feet	No data; limited areal extent	A field analysis indicated the water to be very hard (222 mg/L)
KINZERS FORMATION Ck — Cakss, Ckm, Ckl, Cks	Dark- to medium-gray, sandy limestone (Cakss); white marble (Ckm); limestone of variable composition (Ckl); and dark-gray shale and earthy limestone (Cks), occupies low hills around Bittinger and an isolated area around Rehm Junction	Reported yields range from 4 to 20 gal/min, the median is 10 gal/min for domestic wells	Water is generally very hard; median hardness is 271 mg/L. Analyses indicate that the water is of acceptable quality
TOMSTOWN FORMATION Ct	Primarily gray dolomite and limestone, and considerable interbedded shale in the lower part; occupies only a few small areas in and adjacent to the South Mountain region	A single nondomestic well had a reported yield of 10 gal/min.	No data.
VINTAGE FORMATION Cv	Pure, fine-grained, medium-gray limestone at top; lower part is chiefly medium-gray, knotty dolomite; crops out in a few small areas near Bittinger	A single well from this unit has a reported yield of 5 gal/min and a specific capacity of 0.04 (gal/min)/ft	A field analysis indicates that the water is very hard (274 mg/L).
CAMBRIAN — **ANTIETAM FORMATION** Ca	Chiefly coarse-grained, quartzose sandstone, lower part is dense, resistant quartzite, in places bluish to pink; upper part is granular, white to pinkish sandstone having numerous fossil *Scolithus* tubes; limited distribution, forms ridges in the north and northwest part of the county, crops out in a few localities in the foothills of the Pigeon Hills and in a relatively large area southeast of Littlestown.	The average reported yield of two domestic wells is 4 gal/min, a single nondomestic well yielded 3 gal/min	Two field analyses for hardness indicate that the water is moderately soft (68 mg/L, average). A single complete analysis gives results that slightly exceed recommended limits for iron and manganese
HARPERS FORMATION Ch — Chm, Chm	Graywacke siltstone and graywacke (Chm), and a prominent interval of medium- to thick-bedded, medium-grained quartzite (Chm), subordinate dark-colored phyllite, occurs in three narrow belts in the northern part of the county, in the Pigeon Hills, and in the southeast corner; estimated to be 2,500 to 3,100 feet thick in the South Mountain area.	Reported yields range from 5 to 25 gal/min; the median for domestic wells is 10 gal/min, two nondomestic wells averaged 20 gal/min.	Water is generally hard, having a median hardness of 120 mg/L. An analysis indicates that the water is of acceptable quality
WEVERTON FORMATION Cw	Sequence of quartz phyllites, quartzose graywackes, and quartzites, major ridge former in the South Mountain area; estimated thickness is 800 to 1,000 feet.	No data; yield is likely to be low	No data
CHICKIES FORMATION Cc — Ccq, Ccm, Ccn	Chiefly hard, white, fossil-*Scolithus*-bearing quartzite (Ccq): basal beds contain coarse conglomerate (Ccn), arkose, and black slate (Ccm); found in the Pigeon and Hellam Hills area.	Two domestic wells have an average reported yield of 4 gal/min	A field analysis indicates that the water is very soft (17 mg/L); the water is also low in dissolved solids and potentially corrosive to plumbing
LOUDOUN FORMATION Cld	Dark-gray, dusky-blue, or very dusky red purple phyllites locally interbedded with fine-grained, laminated graywacke; estimated thickness is 100 to 150 feet in the South Mountain area.	No data; yield is likely to be low	No data.
PROTEROZOIC PALEOZOIC — **MARBURG SCHIST** Xam	*Chiefly bluish-gray to silvery-green, fine-grained schist;* beds of quartzite and conglomerate form the upper part of the formation; exposed in the extreme southeast corner of the county.	The median reported yield of three domestic wells is 9 gal/min.	Three field analyses indicate that the water is very soft, the median hardness is 34 mg/L; excessive manganese was found in a single laboratory analysis of the water
PRECAMBRIAN — **METABASALT** Xmb	Characteristically green, greenish-gray, and gray, massive, well-cleaved rock of uniformly fine to medium grain; forms ridge crests and moderate to steep slopes in the South Mountain area; estimated thickness is in excess of 1,000 feet.	The median reported yield of domestic wells is 10 gal/min; 25 percent of these wells have yields of 3 gal/min or less.	Water is generally moderately soft, median hardness is 85 mg/L; dissolved-solids content is low; water may be corrosive to plumbing
METARHYOLITE mr	Mainly hard, dense, fine-grained rock of purplish color, in part containing isolated crystals of feldspar and quartz; also occurs in a large variety of colors—bluish purple, blue gray, brick red, buff, and light green are characteristic; estimated thickness is about 2,200 to 2,900 feet; underlies moderate to steep slopes and ridge crests on South Mountain.	The median reported yield of domestic wells is 8 gal/min; 25 percent of these wells have yields of 3 gal/min or less; nondomestic wells have a median of 30 gal/min.	Water is generally soft to moderately soft; median hardness is 51 mg/L; dissolved-solids content is low; water may be corrosive to plumbing.
GREENSTONE SCHIST vs	Greenish-gray, lustrous phyllite and schist; some is finely banded; light greenish gray, dusky yellow green, and grayish yellow green; thickness generally is less than 100 feet but locally is up to 150 feet; typically forms local intermontane valleys and gentle slopes in the South Mountain area.	A single domestic well has a reported yield of 9 gal/min.	One field analysis indicates that the water is soft (34 mg/L); the water is also low in dissolved solids and may be corrosive to plumbing.

*No age correlations are implied by the order of the members listed.

*Recommended limits for dissolved constituents are from U. S. Environmental Protection Agency (1975, 1977).



INDEX TO SOURCES USED FOR GEOLOGIC MAP COMPILATION

(Some areas use no sources; were made by authors)

SYMBOLS

Inclined — Vertical — Overturned

Strike and dip of bedding

Note: In all cases the strike-and-dip symbol is placed on the exact location where data were obtained. Other symbols based on readings at the same point are placed as near as possible to the bedding symbol location.

Water well and well number

Water well from which water was sampled for chemical analysis, and well number

Spring and spring number

Spring from which water was sampled for chemical analysis, and spring number

Line of geologic cross section

Attitude of diabase sheet
Arrow shows direction of dip of contact

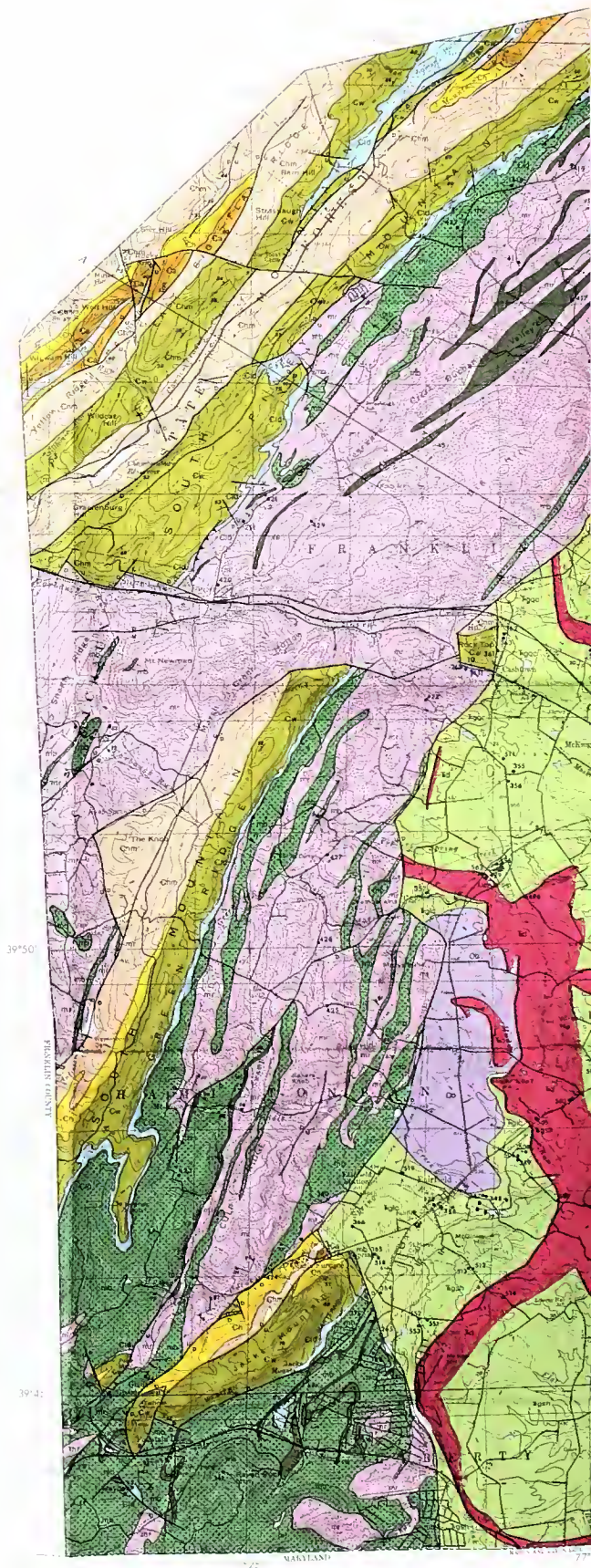
Inclined — Vertical — Multiple joint system

Strike and dip of joint

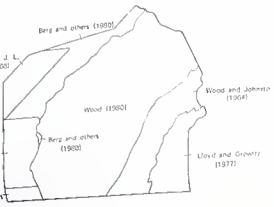
Faults
Includes approximately located and inferred faults

Strike-slip fault; arrows indicate relative movement

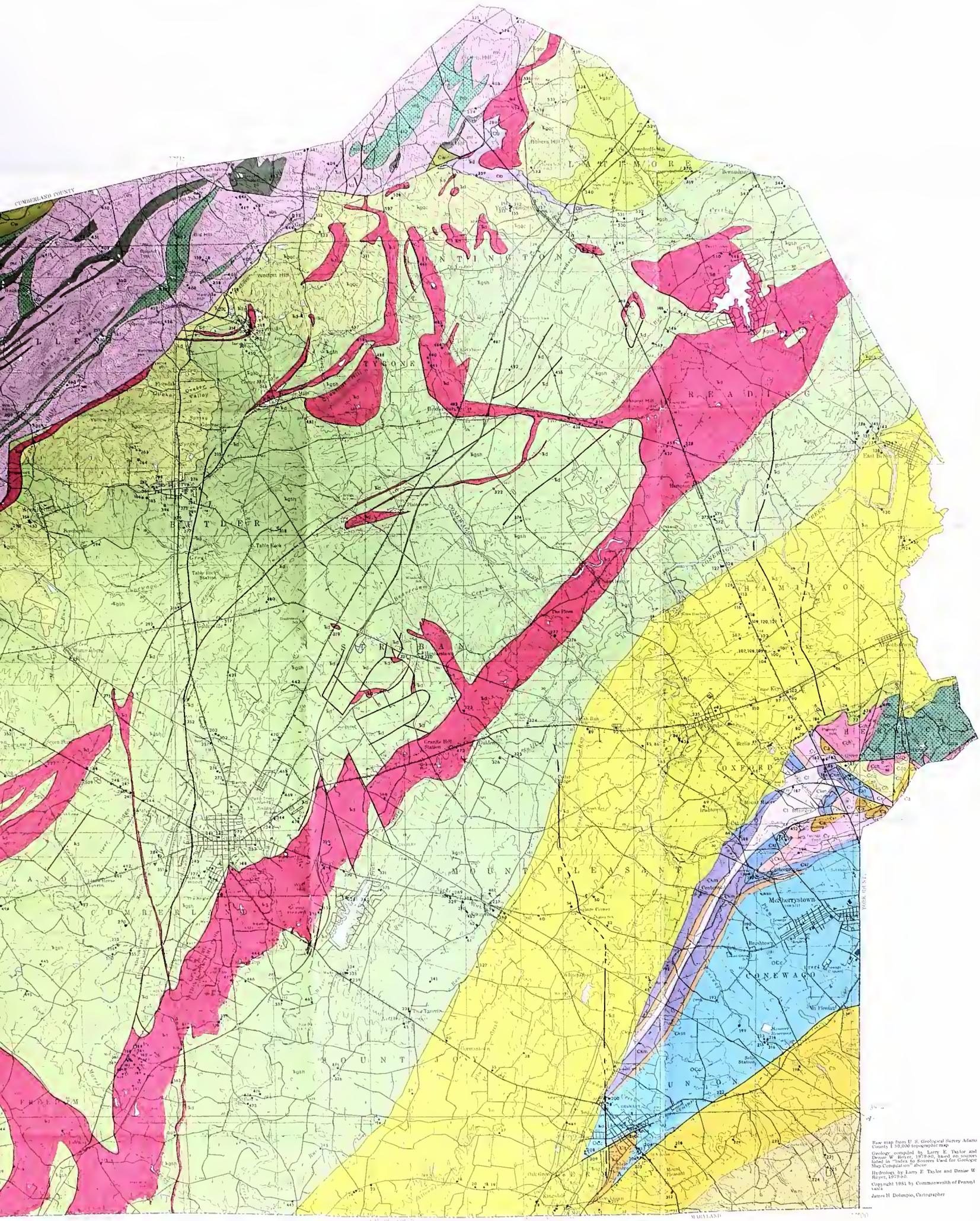
Low-angle reverse or slip (sawteeth on side of upper plate)



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES



INDEX TO SOURCES USED FOR GEOLOGIC MAP COMPILATION
(Some revisions to sources were made by author)



Base map from U. S. Geological Survey Adams County 1:50,000 topographic map

Geology compiled by Larry E. Taylor and Denise W. Reyer, 1979-80, based on sources listed in "Index to Sources Used for Geologic Map Compilation" above

Hydrology by Larry E. Taylor and Denise W. Reyer, 1979-80.

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James H. Dolimpio, Cartographer

ORDOVICIAN	BEEKMANTOWN GROUP Ob	Mountain around Fairfield. Primarily white or gray marble, some of which is coarsely crystalline and veined with calcite near York Springs; may include some unseparated Conococheague or Elbrook limestone of Cambrian age	study in Franklin County found this unit to be one of the better aquifers in the county (Becher and Taylor, in preparation)	No data; water is probably very hard
	CONESTOGA FORMATION Oce	Chiefly thin bedded, very impure, dark-gray limestone having some light gray banding and graphitic shale partings; black to dark gray shale and very impure limestone occur at base; occupies the lowland around Mechanicstown and is probably over 1,000 feet thick	Reported yields range from 5 to 350 gal/min; the medians for domestic and nondomestic wells are 26 gal/min and 28 gal/min, respectively. Specific capacities range from 0.05 to 20 gal/min/ft; the median for domestic wells is 1.1 [gal/min]/ft and the median for nondomestic wells is 2.6 [gal/min]/ft	Water is generally very hard, median hardness is 295 mg/L, both iron and manganese exceeded recommended limits in a sample from this unit
	LEDGER FORMATION Cl	Poorly exposed, coarse-grained, gray dolomite with pure, white and light-gray marble; occupies most of the limestone area north of Edgegrove and west of Ruttinger. Thickness cannot be accurately determined but is estimated to be about 2,000 feet	No data, limited areal extent	A field analysis indicated the water to be very hard (222 mg/L).
	KINZERS FORMATION Ck: Cklg; Ckm; Ckl; Cks	Dark- to medium-gray, sandy limestone (Cklg); white marble (Ckm), limestone of variable composition (Ckm); and dark gray shale and earthy limestone (Ckl), occupies low hills around Ruttinger and an isolated area around Berlin Junction	Reported yields range from 4 to 20 gal/min; the median is 10 gal/min for domestic wells.	Water is generally very hard, median hardness is 274 mg/L. Analyses indicate that the water is of acceptable quality
	TOMSTOWN FORMATION Ct	Primarily gray dolomite and limestone, and considerable interbedded shale in the lower part, occupies only a few small areas in and adjacent to the South Mountain region.	A single nondomestic well had a reported yield of 10 gal/min	No data
CAMBRIAN	VINTAGE FORMATION Cv	Pure, fine-grained, medium-gray limestone at top; lower part is chiefly medium gray, knotty dolomite, crops out in a few small areas near Ruttinger.	A single well from this unit has a reported yield of 5 gal/min and a specific capacity of 0.04 [gal/min]/ft	A field analysis indicates that the water is very hard (274 mg/L)
	ANTIETAM FORMATION Ca	Chiefly coarse-grained, quartzose sandstone; lower part is dense, resistant quartzite, in places bluish to pink; upper part is granular, white to pinkish sandstone having numerous fossil *Scolithus* tubes; limited distribution, forms ridges in the north and northwest part of the county; crops out in a few localities in the foothills of the Pigeon Hills and in a relatively large area southeast of Littlestown.	The average reported yield of two domestic wells is 4 gal/min; a single nondomestic well yielded 4 gal/min	Two field analyses for hardness indicate that the water is moderately soft (68 mg/L, average). A single complete analysis gave results that slightly exceed recommended limits for iron and manganese
	HARPERS FORMATION Ch: Chm; Chm	Graywacke siltstone and graywacke (Ch), and a prominent interval of medium- to thick-bedded, medium-grained quartzite (Chm), subordinate dark-colored phyllite, occurs in three narrow belts in the northern part of the county, in the Pigeon Hills, and in the southeast corner, estimated to be 2,500 to 3,100 feet thick in the South Mountain area	Reported yields range from 5 to 25 gal/min, the median for domestic wells is 10 gal/min, two nondomestic wells averaged 20 gal/min.	Water is generally hard, having a median hardness of 120 mg/L. An analysis indicates that the water is of acceptable quality
	WEVERTON FORMATION Cw	Sequence of quartz phyllites, quartzose graywackes, and quartzites, major ridge former in the South Mountain area; estimated thickness is 800 to 1,000 feet.	No data, yield is likely to be low.	No data
	CHILHOWEE GROUP Ccg; Ccms; Cch	Chiefly hard, white, fossil-*Scolithus*-bearing quartzite (Ccms), basal beds contain coarse conglomerate (Ccg), arkose, and black slate (Cch), found in the Pigeon and Bolham Hills area	Two domestic wells have an average reported yield of 4 gal/min.	A field analysis indicates that the water is very soft (17 mg/L); the water is also low in dissolved solids and potentially corrosive to plumbing.
	LOUDOUN FORMATION Cld	Dark-gray, dusky-blue, or very dusky red-purple phyllites locally interbedded with fine-grained, laminated graywacke; estimated thickness is 100 to 150 feet in the South Mountain area	No data; yield is likely to be low.	No data
PROBABLY LOWER PALEOZOIC	MARBURG SCHIST Xam	Chiefly bluish-gray to silvery-green, fine-grained schist, beds of quartzite and conglomerate form the upper part of the formation; exposed in the extreme southeast corner of the county	The median reported yield of three domestic wells is 9 gal/min.	Three field analyses indicate that the water is very soft, the median hardness is 34 mg/L; excessive manganese was found in a single laboratory analysis of the water.
PRECAMBRIAN	METABASALT pzb	Characteristically green, greenish-gray, and gray, massive, well-cleaved rock of uniformly fine to medium grain, forms ridge crests and moderate to steep slopes in the South Mountain area; estimated thickness is in excess of 1,000 feet.	The median reported yield of domestic wells is 10 gal/min; 28 percent of these wells have yields of 3 gal/min or less.	Water is generally moderately soft, median hardness is 85 mg/L; dissolved-solids content is low; water may be corrosive to plumbing.
	METARHYOLITE mr	Mainly hard, dense, fine-grained rock of purplish color, in part containing isolated crystals of feldspar and quartz; also occurs in a large variety of colors—bluish purple, blue gray, brick red, buff, and light green are characteristic; estimated thickness is about 2,200 to 2,900 feet; underlies moderate to steep slopes and ridge crests on South Mountain	The median reported yield of domestic wells is 8 gal/min, 25 percent of these wells have yields of 3 gal/min or less; nondomestic wells have a median of 30 gal/min	Water is generally soft to moderately soft; median hardness is 51 mg/L; dissolved-solids content is low; water may be corrosive to plumbing
	GREENSTONE SCHIST vs	Greenish-gray, lustrous phyllite and schist; some is finely banded; light greenish gray, dusky yellow green, and grayish yellow green; thickness generally is less than 100 feet but locally is up to 150 feet; typically forms local intermontane valleys and gentle slopes in the South Mountain area.	A single domestic well has a reported yield of 9 gal/min.	One field analysis indicates that the water is soft (34 mg/L); the water is also low in dissolved solids and may be corrosive to plumbing

*No age correlations are implied by the order of the members listed.

**Recommended limits for dissolved constituents are from U. S. Environmental Protection Agency (1975, 1977).

SYMBOLS

Contact
Includes approximately located and inferred contacts.

Dip slip (U, upthrown side; D, downthrown side)

Thrust (T on side of upper plate)

Strike slip (arrows indicate relative movement)

Low-angle reverse or slip (sawteeth on side of upper plate)

Faults
Includes approximately located and inferred faults

Inclined | Vertical | Overturned
Strike and dip of bedding

Note: In all cases, the strike-and-dip symbol is placed on the exact location where data were obtained. Other symbols based on readings at the same point are placed as near as possible to the bedding-symbol location.

Attitude of diabase sheet
Arrow shows direction of dip at contact.

Inclined | Vertical | Multiple joint system
Strike and dip of joint

Water well and well number

Water well from which water was sampled for chemical analysis, and well number

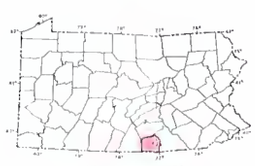
Spring and spring number

Spring from which water was sampled for chemical analysis, and spring number

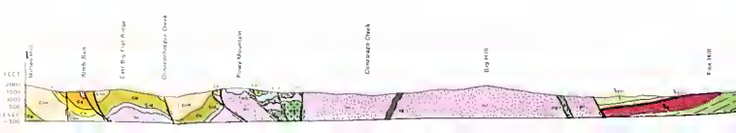
Line of geologic cross section

MAP SHOWING MEDIAN HARDNESS OF GROUNDWATER

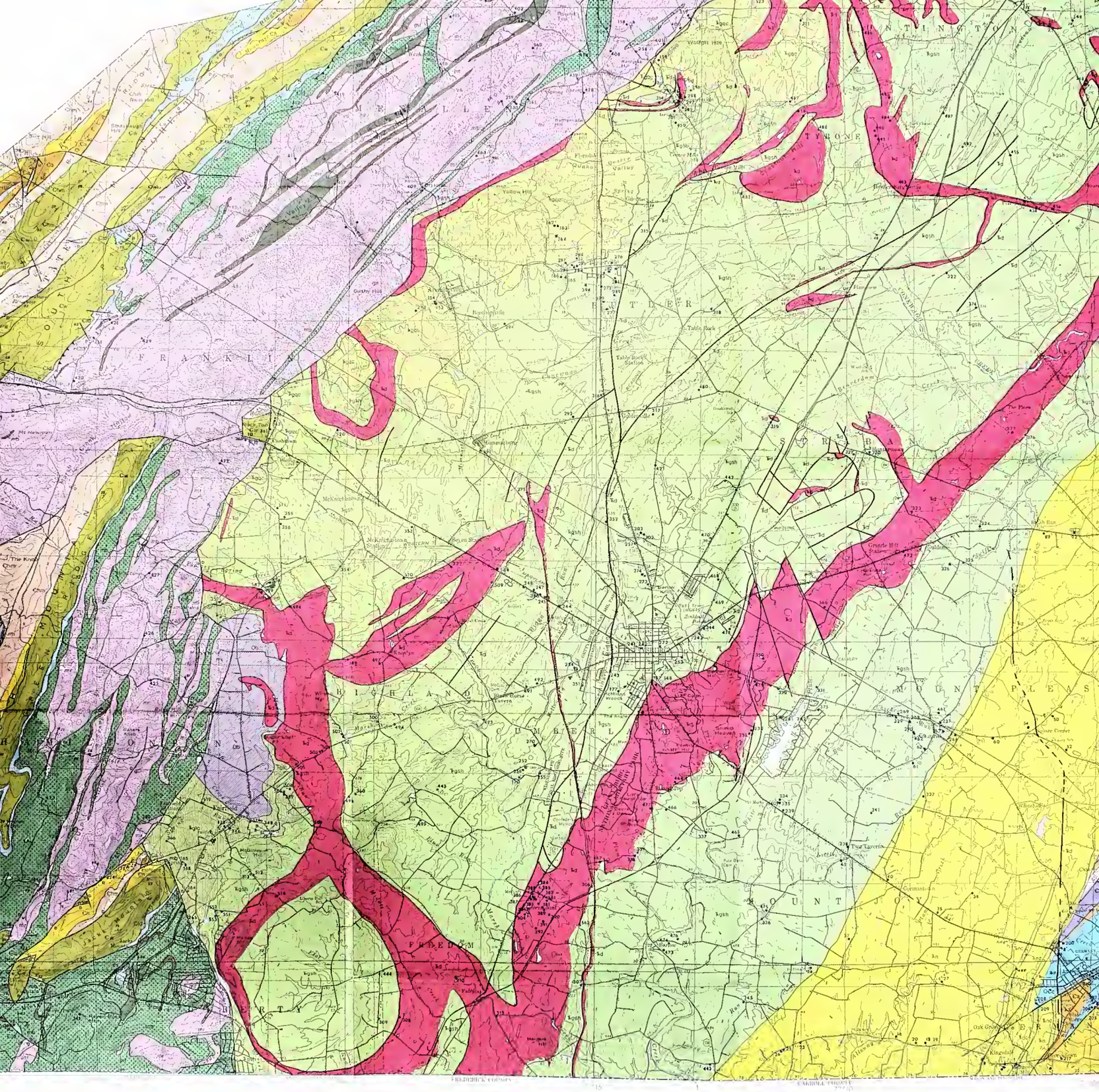
Soft (0-50 mg/L)
Moderately soft (50-100 mg/L)
Hard (100-200 mg/L)
Very hard (>200 mg/L)



LOCATION OF AREA



GEOLOGIC MAP OF



GEOLOGIC MAP OF ADAMS COUNTY, PENNSYLVANIA, SHOWING THE LOCATIONS OF WELLS AND SPRINGS

BY LARRY E. TAYLOR AND DENISE W. ROYER

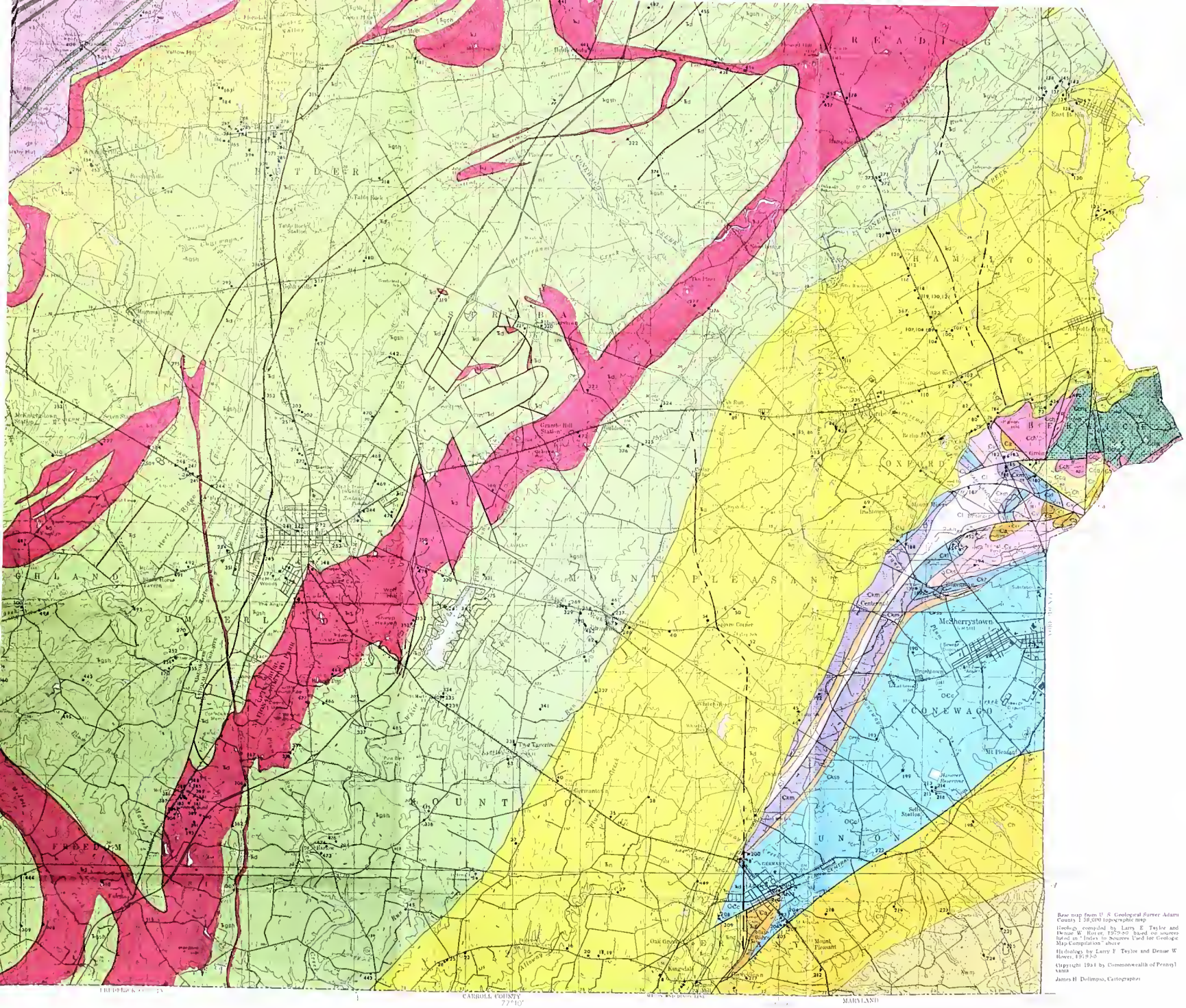
1981

Scale 1 : 50,000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

CROSS SECTION

(Horizontal scale same as map scale, no vertical exaggeration)



ADAMS COUNTY, PENNSYLVANIA, SHOWING THE LOCATIONS OF WELLS AND SPRINGS

BY LARRY E. TAYLOR AND DENISE W. ROYER

1981

Scale 1:50,000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

APPROXIMATE MEAN DECLINATION, 1974

CROSS SECTION

(Horizontal scale same as map scale, no vertical exaggeration)